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Department of Energy

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DEC 14 2007

Mr. Mike Guffey, FFA Project Manager
Division of Waste Management
Kentucky Department for Environmental Protection
14 Reilly Road
Frankfort Office Park
Frankfort, Kentucky 40601

PPPO-02-206-08

RECORD COPY

Mr. David G. Williams
U.S. Environmental Protection Agency
Region 4
DOE Remedial Section
Federal Facilities Branch
Waste Management Division
61 Forsyth Street
Atlanta, Georgia 30303

I-04909-0029

Dear Mr. Guffey and Mr. Williams:

TRANSMITTAL OF ADDENDUM 1-B TO THE SAMPLING AND ANALYSIS PLAN FOR SOIL PILES AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY (DOE/LX/07/0015/B)

Enclosed is the D1 version of *Addendum 1-B to the Sampling and Analysis Plan for Soil Piles at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/LX/07/0015/B). Addendum 1-B to the Sampling and Analysis Plan for Soil Piles supports the site evaluation of the recently identified soil piles at the Paducah Gaseous Diffusion Plant.

The U.S. Department of Energy is requesting that the Commonwealth of Kentucky and the U.S. Environmental Protection Agency review and provide comments or approval within 30 days.

If you have any questions or need additional information, please call Rich Bonczek at (859) 219-4051.

Sincerely,

Reinhard Knerr
Paducah Site Lead
Portsmouth/Paducah Project Office

REVIEWED FOR CLASSIFICATION
MBS JAN 10 08
Initials Date
UNCLASSIFIED

Enclosure:
Addendum 1-B to SAP for Soil Piles

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DOE/LX/07-0015/B
Secondary Document

Addendum 1-B
to the
Sampling and Analysis Plan for Soil Piles at the Paducah Gaseous Diffusion Plant Paducah, Kentucky

Sampling and Analysis Plan for the Characterization of PGDP Soil Piles

Characterization: 1-B Study Area

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DOE/LX/07-0015/B
Secondary Document

Addendum 1-B
to the
Sampling and Analysis Plan for Soil Piles at the Paducah Gaseous Diffusion Plant Paducah, Kentucky

Sampling and Analysis Plan for the Characterization of PDGP Soil Piles

Characterization: 1-B Study Area

Date Issued—December 2007

Prepared for the
U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
PADUCAH REMEDIATION SERVICES, LLC
managing the
Environmental Remediation Activities at the
Paducah Gaseous Diffusion Plant
Under contract DE-AC30-06EW05001

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ACRONYMS

AOC	Area of Concern
ASTM	American Society for Testing and Materials
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DPT	direct push technology
EPA	U.S. Environmental Protection Agency
GWS	gamma walkover survey
ISOC	*In Situ* Object Counting System
NSDD	North-South Diversion Ditch
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PRS	Paducah Remediation Services, LLC
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
VOC	volatile organic compound
XRF	X-ray fluorescence

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1. OVERVIEW

This Addendum 1-B was prepared to support characterization of soil piles listed in the February 16, 2007, Notification Letter (DOE 2007) that are adjacent to Little Bayou Creek or the North-South Diversion Ditch (NSDD). Soil piles found in "Subunit I" (see Figure 1) are not included as they were the subject of Addendum 1-A. This Addendum 1-B is a companion document to the *Sampling and Analysis Plan for Soil Piles at the Paducah Gaseous Diffusion Plant,* DOE/LX/07/0015&D2/R1, and should be considered in conjunction with the provisions contained therein. To facilitate broader characterization of the Paducah Gaseous Diffusion Plant (PGDP) soil piles, the planned addenda to the Sampling and Analysis Plan (SAP) are as follows:

- *Addendum 1-A:* Little Bayou Creek Study Area between McCaw Road and Outfall 002 Ditch
- *Addendum 1-B:* Remaining soil piles along Little Bayou Creek and along the NSDD
- *Addendum 2:* Bayou Creek Study Area - Bayou Creek and unnamed tributary.

Each of these study areas contains soil piles found outside of the PGDP and these piles are shown in Figure 1.

1.1 STUDY AREA DEFINITION

The Addendum 1-B soil piles consist of four areas east of PDGP along Little Bayou Creek and two areas along the NSDD. The southern portion along Little Bayou Creek and PGDP Outfall 011 also includes Areas of Concern (AOCs) 492 and 541, also known as soil piles AR and O respectively. The Addendum 1-B study area includes 40 discrete soil piles covering an approximate area of 2.3 acres. Figure 1 illustrates soil pile locations and the geographic extent of the 1-B Study Area.

Addendum 1-B soil piles differ widely in total surface area and in pile geometry. Several are small, circular mounds with the smallest soil pile covering 36 ft^2. The larger soil piles are generally linear in nature, with the largest pile covering 39,950 ft^2. The height of the soil piles also varies considerably, with piles ranging from approximately 1 to 10 ft high.

The soil piles were divided into two groups: small and large. Soil piles whose length and width are less than or equal to 30 ft were classified as small; soil piles whose length or width are greater than 30 ft were classified as large.

Since the Addendum 1-B Study Area covers a large geographic area, it has been divided into six discrete investigative subunits. Figures 2 through 7 provide an illustration of each subunit. Table 1 provides a summary of the physical locations and dimensions of the Addendum 1-B soil piles.

Addendum 1-B will apply a conservative 25 ft sample spacing as a means of determining if contamination is present. If required, contingency samples will be collected using 10 ft spacing to delineate contaminant boundaries. Systematic sampling will be conducted throughout the soil column on each pile. Small piles will undergo sampling at a single location. Multiple intervals will be acquired at each location where soil pile height is greater than 3 ft. Large soil piles will undergo sampling on a systematic, random 25 ft sample grid. This spacing was adopted to accommodate the dimensions of the Addendum 1-B large soil piles, which generally elongated and often elongated in multiples of 25.

The only currently identified contamination is data acquired from biased sampling in the fall of 2002 at AOCs 492 and 541. The Addendum 1-A sampling effort has shown little detectible contamination in nearby Soil Pile I; therefore, the Addendum 1-B soil piles (with the exception of Subunit 3 AOCs 492 and 541) meet the requirements of a Class II Area as defined by MARSSIM and NUREG-5849, which define Class II Areas as, "*areas that have the potential for contamination or known contamination, but are not expected to exceed the cleanup levels*" (MARSSIM 2000). MARSSIM/NUREG-5849 prescribe sample spacing at 10 meters (32.8 ft) as sufficient to determine if contamination is present. Use of a sampling grid utilizing 25 ft lateral and longitudinal spacing for initial data gathering, and use of 10 ft spacing to delineate contamination boundaries, meets these requirements.

Similar to Addendum 1-A, a systematic 10 foot grid will be used to characterize Subunit 3 soil piles and contingency sampling will be employed if necessary to define the extent of contamination. In addition, sampling will be segregated by surface and subsurface sampling. This will include discrete surface samples collected from 0-1 ft and depth samples collected over each three foot interval of soil column, until natural grade is reached. The 10 ft sampling grid proposed for Subunit 3 soil piles is consistent with Subpart N of 40 *CFR* Part 761.

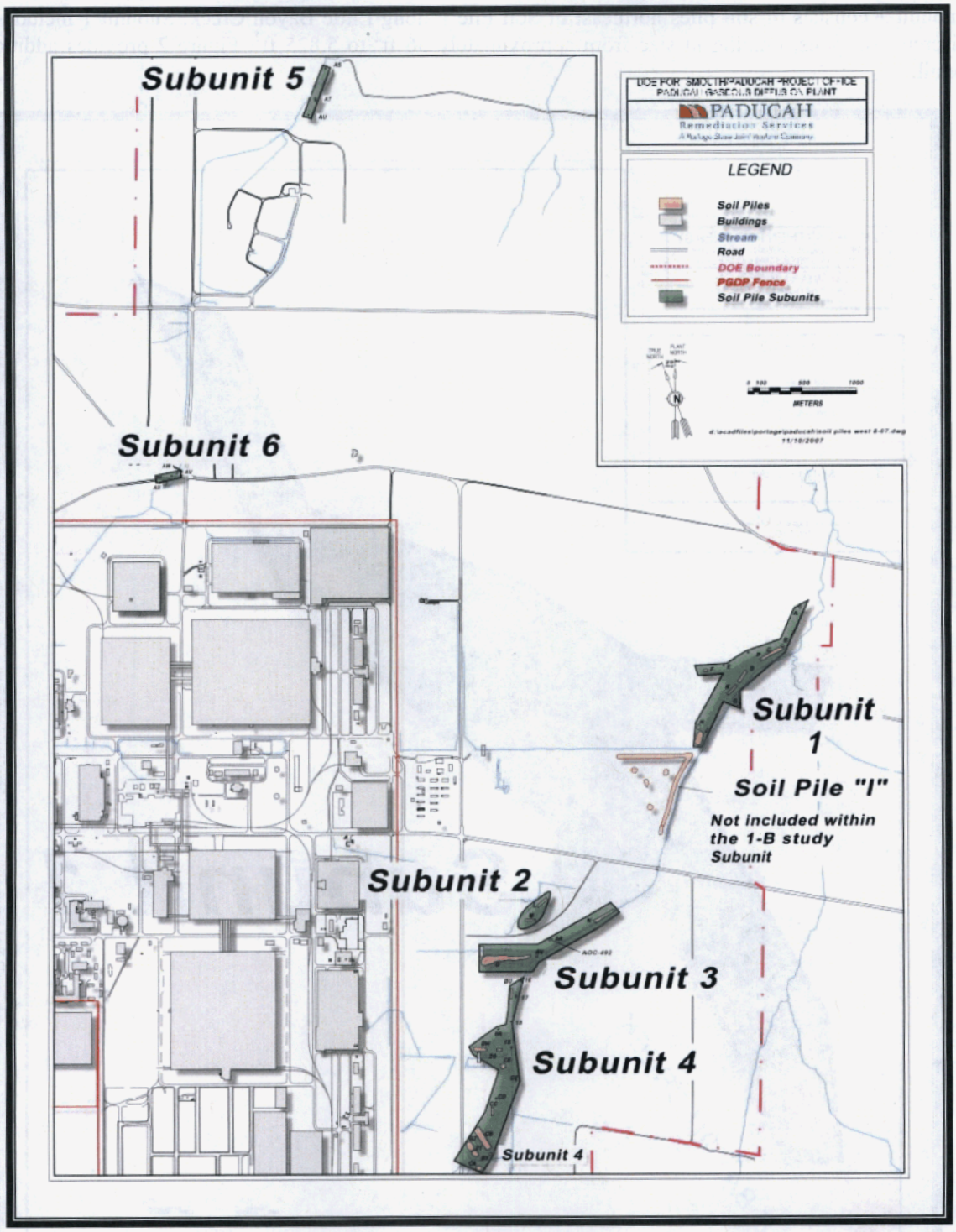

Figure 1. Addendum 1-B Study Area

Subunit 1

Subunit 1 consists of soil piles northeast of Soil Pile I along Little Bayou Creek. Subunit 1 includes 11 discrete soil piles, ranging in size from approximately 36 ft^2 to 5,825 ft^2. Figure 2 provides additional detail.

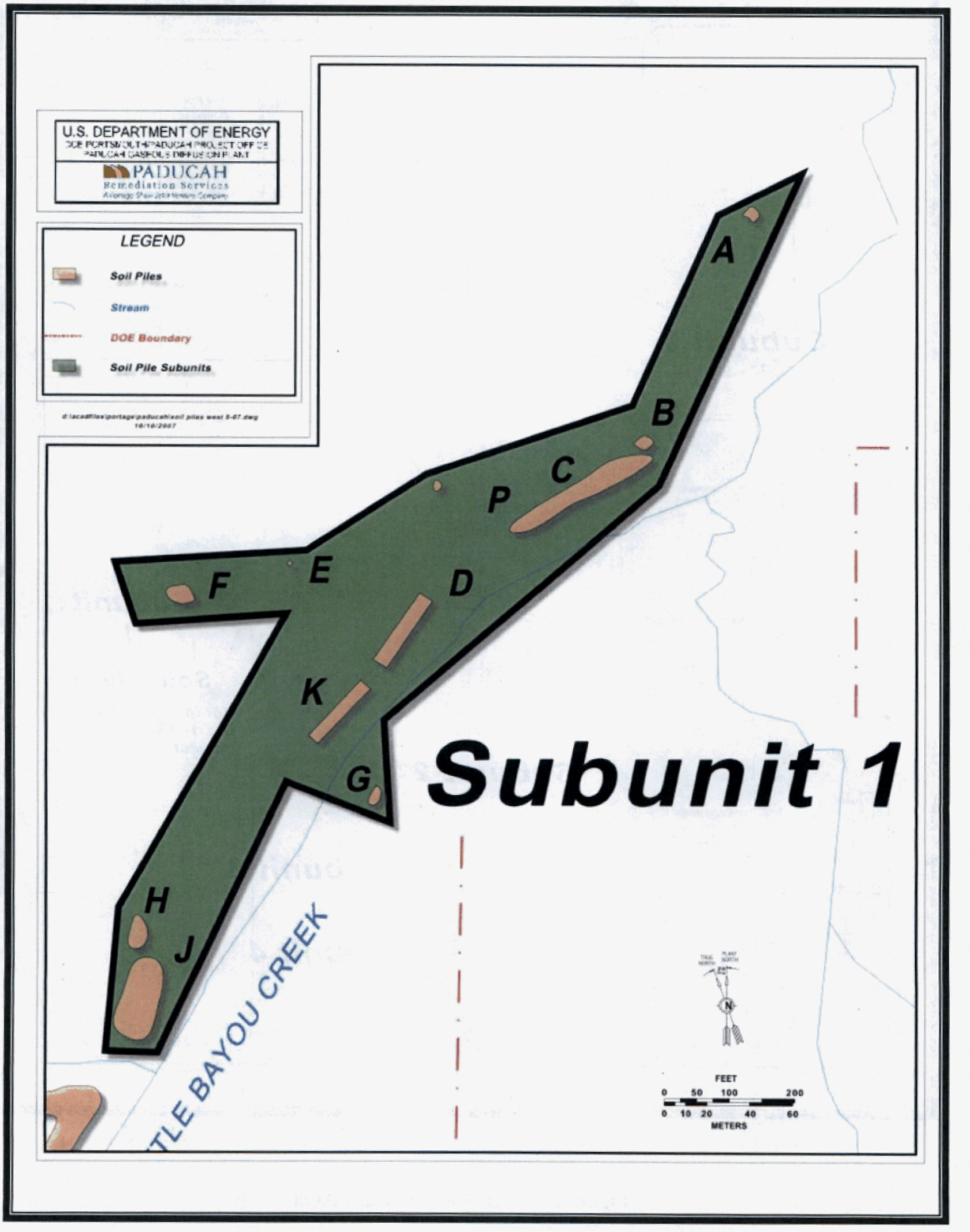

Figure 2. Subunit 1 Soil Piles

Subunit 2

Subunit 2 is located south of McCaw Road and east of Dyke Road. It includes two discrete piles. These soil piles are relatively large, ranging in size from approximately 1,700 ft^2 to 2,360 ft^2. Figure 3 provides additional detail.

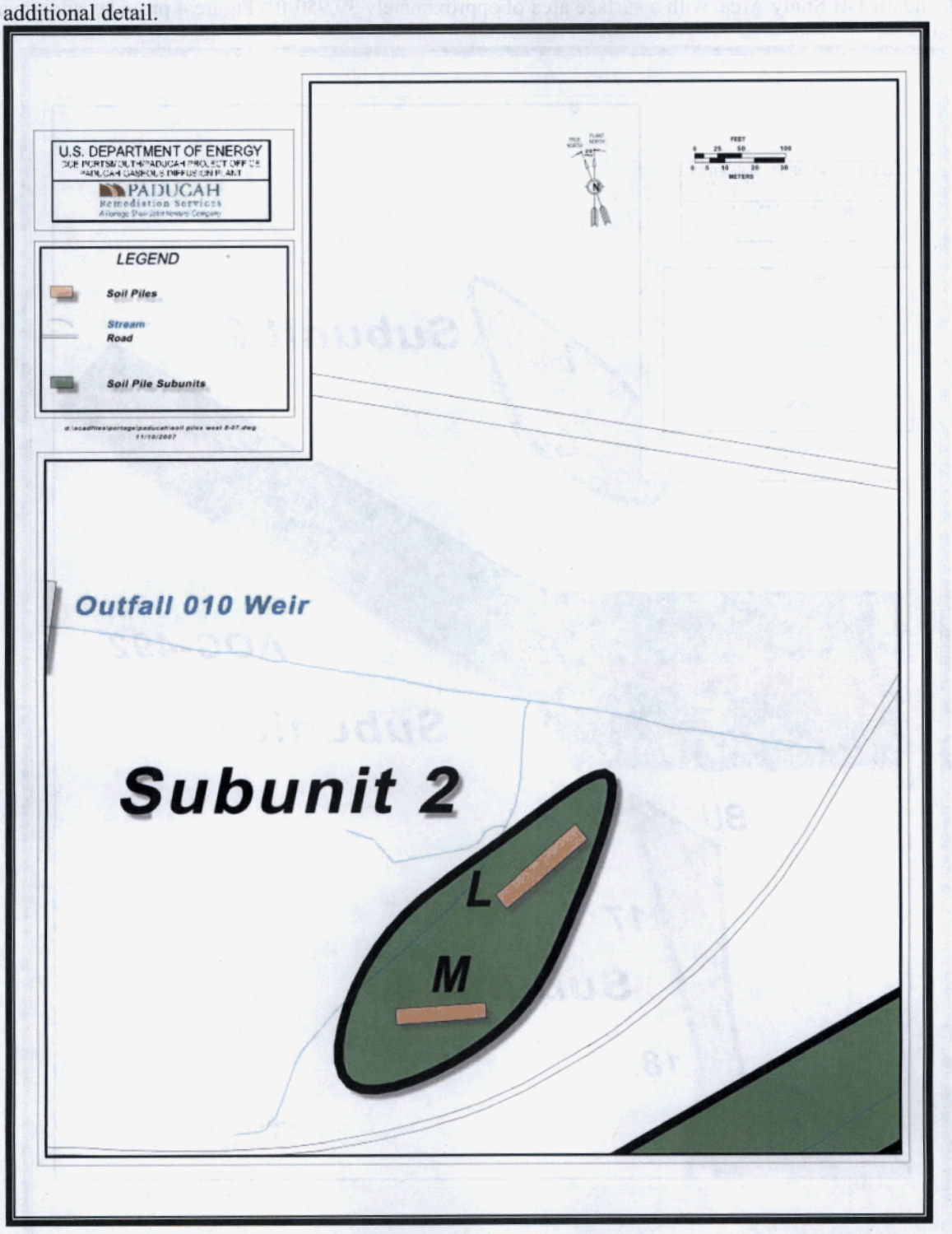

Figure 3. Subunit 2 Soil Piles

Subunit 3

Subunit 3, also located south of McCaw Road and east of Dyke Road, consists of AOCs 492 (Soil Pile AR), AOC 541 (Soil Pile O), Soil Pile BV, and Soil Pile N. AOC 541 is the largest soil pile feature in the Addendum 1-B Study Area, with a surface area of approximately 39,950 ft^2. Figure 4 provides additional detail.

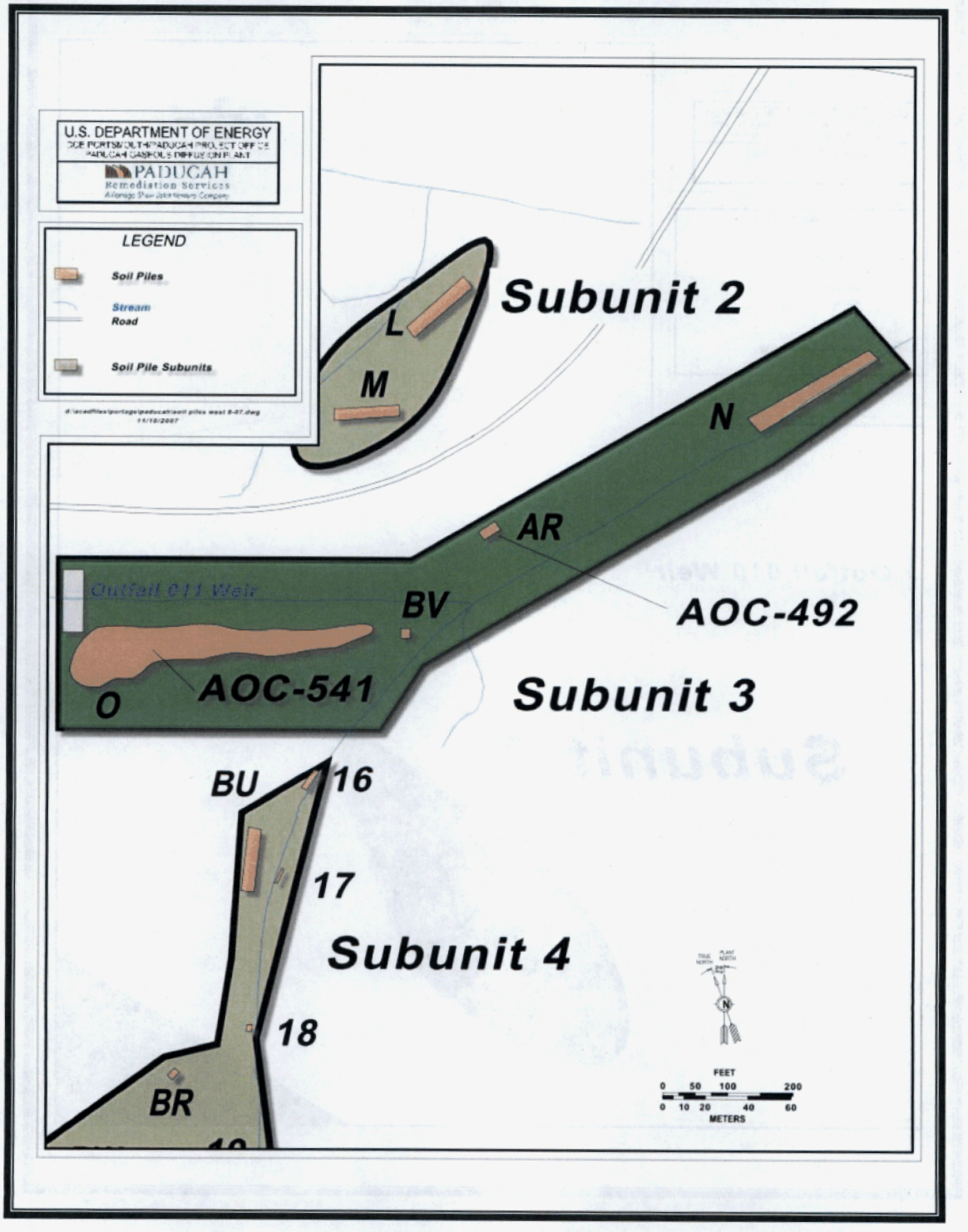

Figure 4. Subunit 3 Soil Piles

Subunit 4

Subunit 4 is located east of Dyke Road and consists of numerous piles distributed near Little Bayou Creek. It includes 17 piles, ranging in size from approximately 80 ft^2 to 11,250 ft^2. Figure 5 provides additional detail.

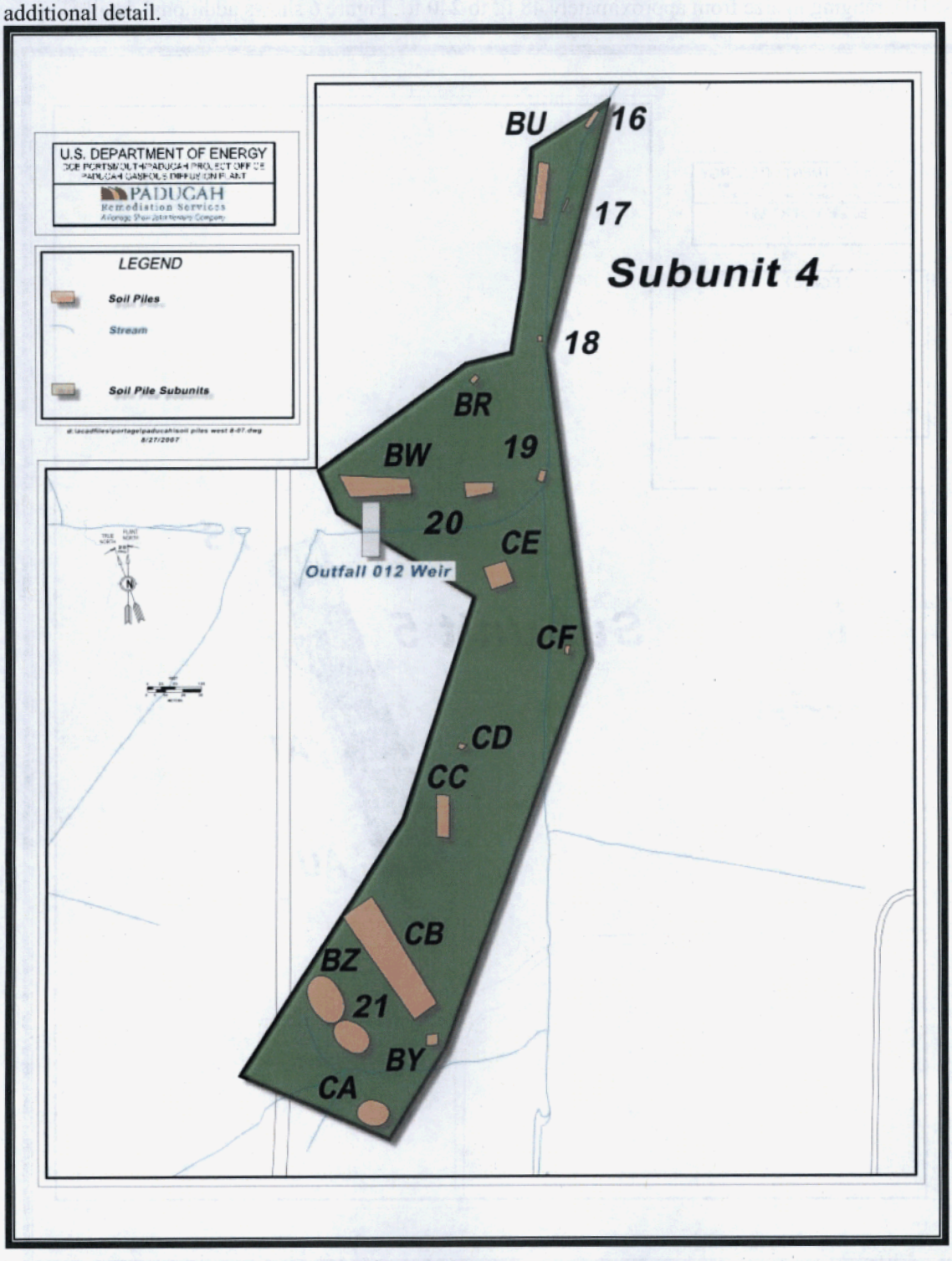

Figure 5. Subunit 4 Soil Piles

Subunit 5

Subunit 5 is located approximately 1,200 meters north of the PGDP fence; however, it is located within the U.S. Department of Energy (DOE) Reservation and consists of three small soil piles distributed along the NSDD, ranging in size from approximately 48 ft^2 to 240 ft^2. Figure 6 shows additional detail.

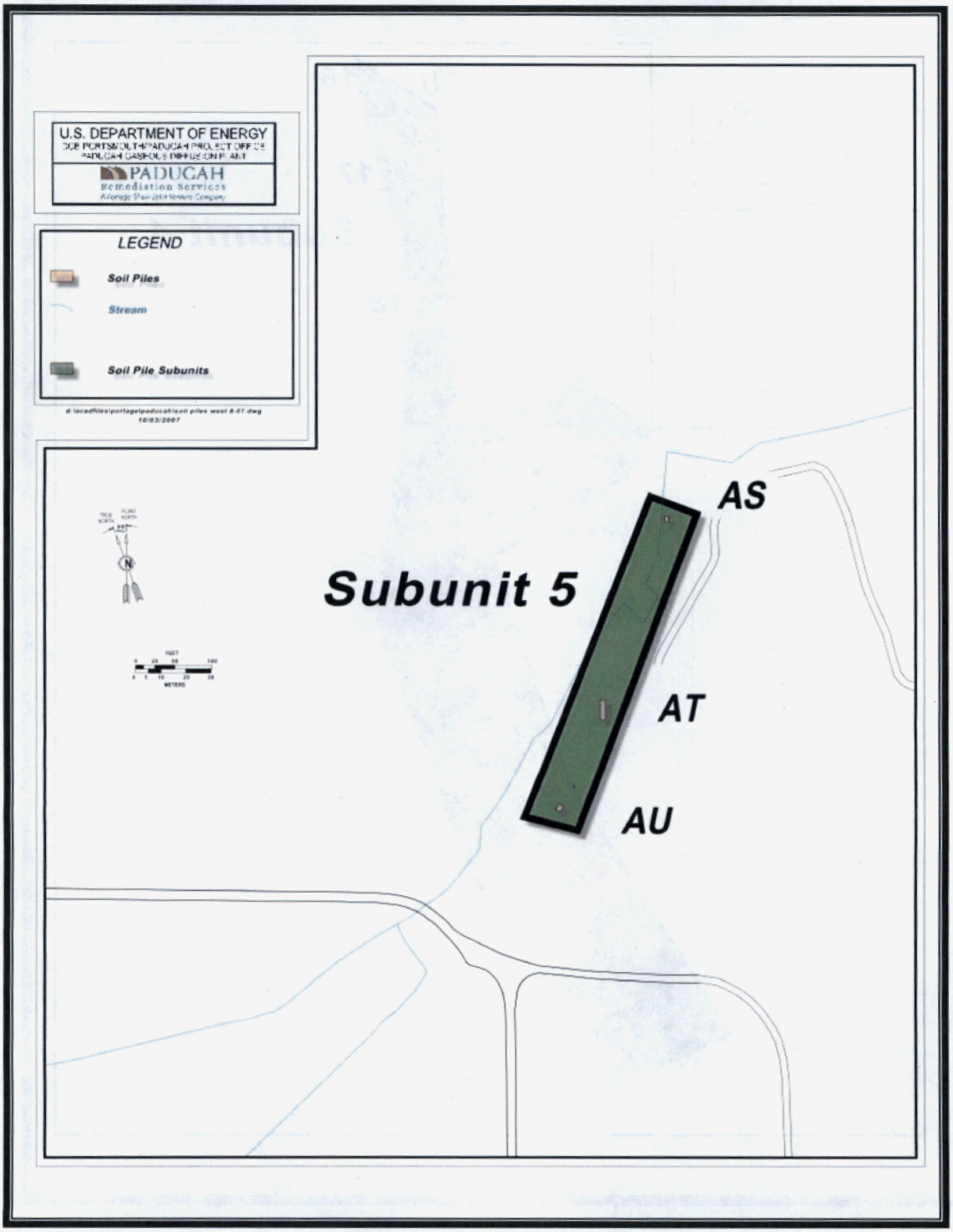

Figure 6. Subunit 5 Soil Piles

Subunit 6

Subunit 6 is located just north of the PGDP fence; however, it is located within the DOE Reservation and consists of three soil piles along the NSDD, ranging in size from approximately 72 ft^2 to 320 ft^2. Figure 7 provides the detail.

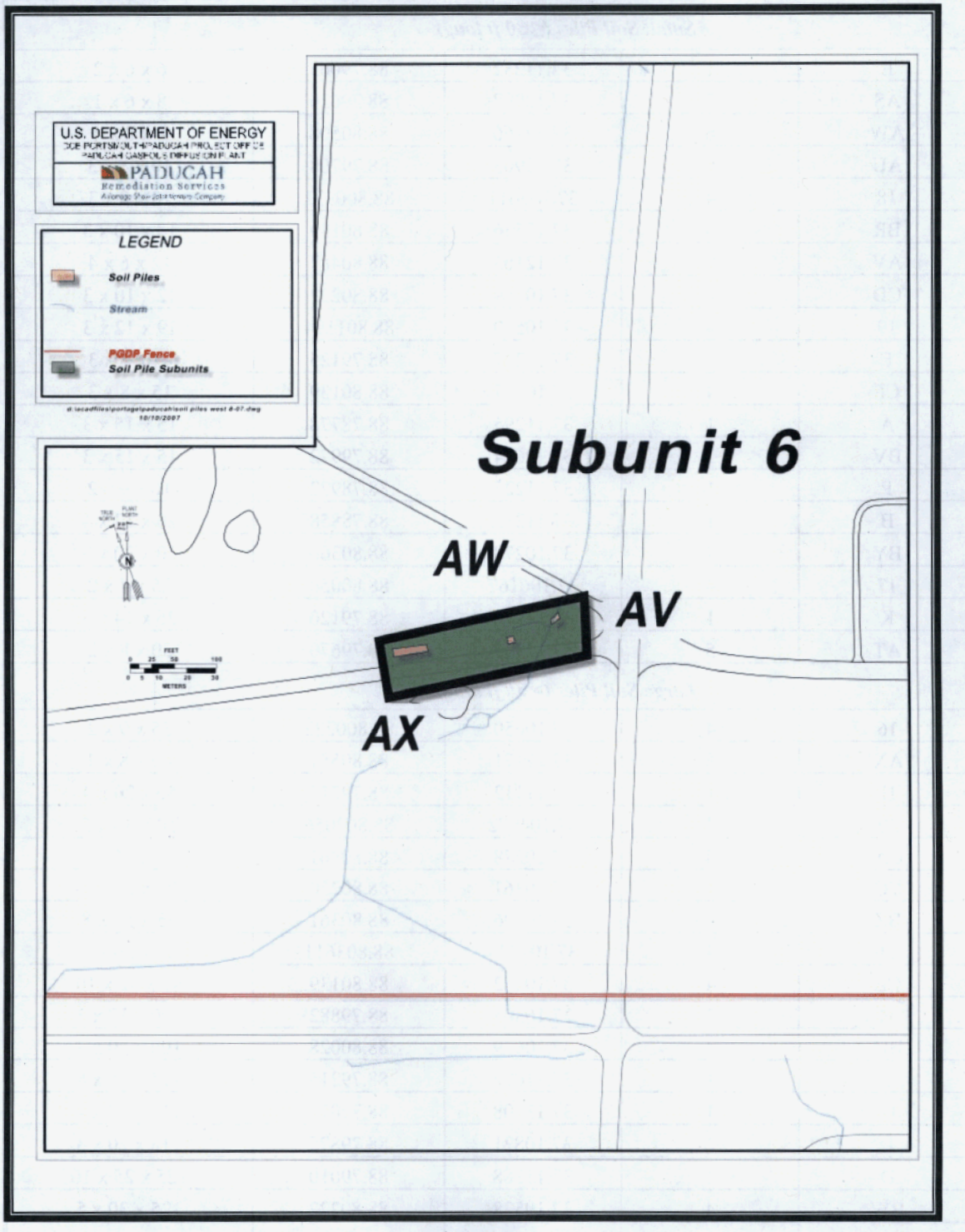

Figure 7. Subunit 6 Soil Piles

Table 1. Addendum 1-B Soil Pile Locations and Dimensions

Pile Designation	Subunit	Point Location (Latitude-north)	Point Location (Longitude-west)	Soil Pile Dimensions (LxWxH - Ft)
Small Soil Piles (≤ 30 ft long)				
E	1	37.11232	88.79065	6 x 6 x 2
AS	5	37.12998	88.79670	8 x 6 x 1
AW	6	37.12166	88.80508	8 x 8 x 4
AU	5	37.12903	88.79708	10 x 8 x 3
18	4	37.105611	88.800972	10 x 8 x 3
BR	4	37.10556	88.80139	15 x 10 x 3
AV	6	37.12163	88.80487	12 x 6 x 4
CD	4	37.10389	88.80222	12 x 10 x 3
19	4	37.10500	88.801194	19 x 12 x 3
F	1	37.11237	88.79125	14 x 8 x 3
CF	4	37.10417	88.80139	15 x 8 x 3
A	1	37.11295	88.78778	15 x 15 x 3
BV	3	37.10694	88.79972	15 x 15 x 3
P	1	37.11227	88.78972	16 x 9 x 2
B	1	37.11233	88.78858	20 x 13 x 4
BY	4	37.10278	88.80306	20 x 20 x 3
17	4	37.106167	88.80050	25 x 4 x 2
K	1	37.11170	88.79120	26 x 14 x 3
AT	5	37.12935	88.79670	30 x 8 x 2
Large Soil Piles (> 30 ft long)				
16	4	37.10650	88.800222	35 x 9 x 2
AX	6	37.12171	88.80551	40 x 8 x 4
H	1	37.11112	88.79215	50 x 20 x 4
20	4	37.104972	88.802056	50 x 30 x 5
CA	4	37.10278	88.80361	50 x 35 x 8
CC	4	37.10361	88.80250	75 x 25 x 3
BZ	4	37.10306	88.80361	75 x 50 x 8
21	4	37.102944	88.803611	40 x 50 x 8
CE	4	37.10472	88.80139	42 x 42 x 10
M	2	37.10805	88.79882	100 x 17 x 3
BU	4	37.10639	88.80028	100 x 20 x 4
J	1	37.11092	88.79215	115 x 55 x 8
G	1	37.11108	88.79070	117 x 19 x 4
L	2	37.10821	88.79875	118 x 20 x 3
D	1	37.11188	88.79010	125 x 25 x 10
BW	4	37.10528	88.80222	125 x 30 x 5
N	3	37.10813	88.79901	213 x 21 x 4

Table 1. Addendum 1-B Soil Pile Locations and Dimensions (Continued)

Pile Designation	Subunit	Point Location (Latitude-north)	Point Location (Longitude-west)	Soil Pile Dimensions (LxWxH - Ft)
Large Soil Piles (> 30 ft long)				
C	1	37.11212	88.78918	223 x 25 x 10
CB	4	37.10306	88.80306	225 x 50 x 5
AOC Piles				
AR (AOC 492)	3	37.10723	88.79889	15 x 30 x 1
O (AOC 541)	3	37.10739	88.80099	470 x 85 x 3

1.2 TECHNICAL BASIS FOR SAMPLING

The primary objectives of the sampling effort are to 1) acquire sufficient field and fixed laboratory data to determine if contamination[1] is present in Addendum 1-B soil piles, if found, 2) determine the extent of contamination, and 3) acquire sufficient data to support informed decision-making. In order to obtain data that will meet these goals, a systematic sampling approach was developed to support sampling for all of the Addendum 1-B soil piles. Specific study objectives include the following:

- Determine if contamination is present and, if present, then identify contaminants;
- Eliminate chemicals/radionuclides not detected in Addendum 1-B soil piles, from further consideration as contaminants of potential concern;
- Estimate the average[2] concentration for a soil pile for identified contaminants; and
- Determine how contaminants are spatially distributed.

In addition, lessons learned from data acquisition at Soil Pile I (Addendum 1-A) are incorporated into this plan as follows:

1. Use of the portable direct push technology (DPT) sampler:
   - Prevents the need to site, design, and build a road suitable for vehicle mounted DPT units,
   - Minimizes clearing and grubbing efforts, and
   - Minimizes the potential for personal injury due to the relatively light weight of the equipment.
2. Complete fieldwork in the fall and/or winter months to enable the following:
   - Reduce or eliminate heat stress concerns,
   - Minimize contact with biting insects and snakes, and
   - Reduce expenditures related to clearing and grubbing because much of the local vegetation will have lost summer foliage.

[1] Contamination is defined as contaminants of potential concern concentrations that exceed regulatory thresholds or result in unacceptable risks to recreational site users.

[2] Small soil piles, as defined in this Addendum, requiring only one sample will not be averaged.

3. Increased use of field grade/portable X-ray fluorescence (XRF). Initial comparisons of XRF uranium to laboratory results indicate relatively strong comparability.

4. Based upon the results of the Pile I gamma walkover survey and the laboratory results collected in 2006 and 2007, less data will be collected as part of Addendum 1-B.

    - A systematic evaluation of existing data and incremental data gathering results in project cost savings and better decision making.

5. Reduction of analytical parameters, such as volatile organic compounds (VOCs) and semivolitile organic compounds (SVOCs) as these analytes were at or below the detection limits.

1.2.1 Background

Biased sampling performed in 2001 and 2002 identified elevated levels of radionuclides, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons, and metals in AOCs 492 and 541. The companion SAP summarizes the results of this study in its Table 1. No previous sampling efforts have been completed for soil piles north of Outfall 002 along Little Bayou Creek or for piles along the NSDD. Upon discovery of the soil piles in November, 2006, Paducah Remediation Services, LLC, (PRS) began a systematic gamma walkover survey (GWS) of all newly identified soil piles outside the PGDP industrialized area. The objective of the GWS was to identify soil piles exhibiting radioactivity at levels greater than twice background. The GWS indicated that there are 11 soil piles within the study area with gamma readings greater than twice the PGDP background level. The Soil Piles with gamma readings greater than twice the PGDP background level are shown in Table 2. In addition, during sampling activities a separate GWS will be performed (100% coverage) to map identified soil piles using a global positioning system.

Table 2. Summary of Addendum 1-B Soil Piles GWS

Soil Pile	Pile Location
A	Subunit 1
C	Subunit 1
D	Subunit 1
E	Subunit 1
J	Subunit 1
L	Subunit 2
M	Subunit 2
N	Subunit 3
O (AOC 541)	Subunit 3
AR (AOC 492)	Subunit 3
AW	Subunit 6

1.2.2 Sampling approach

A systematic judgmental sampling approach will be implemented for small soil piles and a systematic random approach will be implemented for large soil piles. Each is designed to ensure data are acquired from all of the Addendum 1-B soil piles and a sufficient number of samples are collected to aid in determining the concentration and distribution of constituents throughout the study area. Figure 8 outlines the planned approach for both small and large soil piles.

Each small soil pile (Table 1) will undergo systematic sampling by selecting a single location from the tallest portion of the pile. Large soil piles will undergo systematic random sampling by employing 25 ft sample spacing with a random start grid. Samples will be collected from the pre-determined locations, starting at the top of the soil piles and extending down to the interface with the natural grade. Samples will be collected over three ft intervals or down to the natural grade whichever is less. Experience during sample collection at Soil Pile I (Addendum 1-A) indicates that soil pile heights are variable. As a result, the actual number of samples may increase or slightly decrease over the course of the effort to account for increases/decreases in soil pile heights. For all soil piles, if contamination is observed through field screening analysis, contingency samples will be collected to support delineation of contamination.

Because contamination above PGDP risk-based action levels (Risk Methods Document) was identified previously in samples from AOCs 492 and 541 (see companion SAP Section 1.3), the sampling approach for AOCs 492 and 541 differs in that a systematic 10 ft sample grid will be employed. Similar to the sampling approach used at Soil Pile I, a surface sample will be collected from the 0-1 ft soil interval and depth samples will be collected in three ft intervals to a depth of natural grade.

Data acquisition for all soil piles will rely on both field measurements and fixed laboratory data to determine if contamination exists in Addendum 1-B soil piles. All samples will undergo field analyses and 10% of all samples will be randomly selected for fixed laboratory analysis. As discussed, contingency samples are planned to support delineation of contamination, if found.

Field methods will include Resource Conservation and Recovery Act metals and uranium analysis by *ex situ* XRF and PCBs using immunoassay/colorimetric test kits. Lessons learned from the Soil Pile I sampling effort indicate that use of *In Situ* Counting Object System (ISOCS) analysis is not as effective in providing real-time uranium activity data when compared with XRF. As a result, ISOCS will not be employed for Addendum 1-B. All samples will be field scanned for alpha, beta, and gamma activity using hand held instruments as part of preparations for transport and/or shipment. If a sample yields an elevated scan for radioactivity not identified by the XRF as uranium, a sample will be sent to the fixed-base laboratory for radionuclide analysis.

Laboratory analytical requirements will include a comprehensive list of constituents known to be present at PGDP, identified during prior investigations at Soil Pile I, and AOCs 492 and 541. The results of comprehensive sampling completed at Soil Pile I (Addendum 1-A) in 2007 show detections for two VOCs: ethylbenzene (maximum detection = 0.9 ug/kg) and m,p-xylene (maximum detection = 1.6 ug/kg). Each compound is well below the allowable soil levels in excavated materials to be used for unrestricted off-site purposes: ethylbenzene = 900 ug/kg and total xylene = 5000 ug/kg, respectively[3]. Both also are several orders of magnitude below PGDP no action levels for child recreator contact with soil/sediment: ethylbenzene = 23,400 ug/kg and total xylene = 425,000 ug/kg, respectively, as noted in the 2001 Paducah Risk Methods Document. Based on these lessons learned, VOCs will not be included in the analytical suite for Addendum 1-B.

[3] In addition, neither trichloroethene nor trichloroethane was detected in samples collected at Soil Pile I. Classification Outlines for UST, 401 *KAR* 42:080, Kentucky Environmental Public and Protection Cabinet/Division of Waste Management, Underground Storage Tank Branch, August 2006.

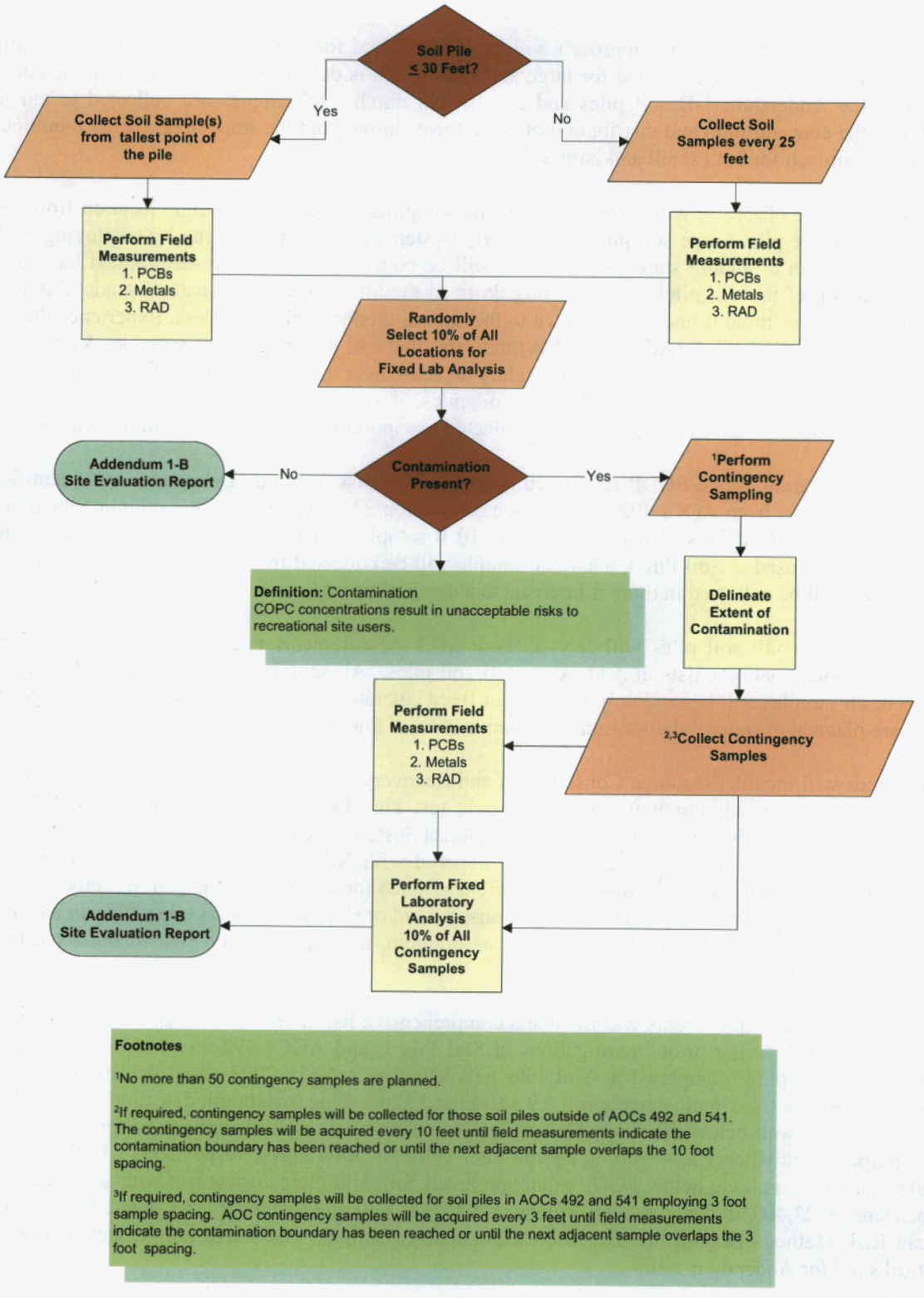

Figure 8. Addendum 1-B Sampling Approach

A previous archeological survey for the study area identified no significant archeological features. No soil removal is planned. If archeological features/artifacts are discovered during clearing, grubbing, and soil sampling, then work will be stopped immediately and the project manager will be notified. In accordance with the approved Cultural Resources Management Plan, DOE will proceed with any activity in previously disturbed areas and will not adversely impact any nearby archeological property.

1.2.2.1 Small soil piles

To evaluate small soil piles, a single location at the highest point of the pile will be sampled. Table 3a delineates the footprint of the Addendum 1-B soil piles and illustrates how the sample density will be implemented for each. Individual soil pile maps and corresponding sample location(s) are provided in the appendix. Discrete samples will be collected over three ft intervals or down to the interface with the natural grade, whichever is less. Each sample interval will undergo field measurements and every small soil pile will have one sample submitted for fixed laboratory analysis. In the event that there is more than one depth interval to be sampled per pile, the interval sample submitted for fixed laboratory analysis will be randomly selected. Table 4 details the analytical suite for fixed laboratory analyses.

Table 3a. Addendum 1-B Sample Density for Small Soil Piles

Small Soil Pile Designator:	*Subunit*	*Pile Length (ft):*	*Pile Width (ft)*	*Pile Height (ft)*	*Pile Area (ft2)*	*# Depth Intervals:*	*# Locations:*	*Estimated # of Samples:*
E	1	6	6	2	36	1	1	1
AS	5	8	6	1	48	1	1	1
AW	6	8	8	4	64	2	1	2
AU	5	10	8	3	80	1	1	1
18	4	10	8	3	80	1	1	1
BR	4	15	10	3	150	1	1	1
AV	6	12	6	4	72	2	1	2
CD	4	12	10	3	120	1	1	1
19	4	19	12	3	228	1	1	1
F	1	14	8	3	112	1	1	1
CF	4	15	8	3	120	1	1	1
A	1	15	15	3	225	1	1	1
BV	3	15	15	2	225	1	1	1
P	1	16	9	2	144	1	1	1
B	1	20	13	4	260	2	1	2
BY	4	20	20	3	400	1	1	1
17	4	25	4	2	100	1	1	1
K	1	26	14	3	364	1	1	1
AT	5	30	8	2	240	1	1	1
						Subtotal:	19	22

1.2.2.2 Large soil piles

Large soil piles are defined as those soil piles that exhibit a linear measurement greater than 30 ft. Table 3b provides the dimensions and areas covered by each of the soil piles. A grid employing 25 ft linear sample spacing has been applied to each of the soil piles. Discrete samples will originate at the top of each pile and will be collected over three ft intervals or down to the interface with the natural grade, whichever is less. Each interval will undergo field analysis, with 10% of samples randomly selected to undergo fixed laboratory analyses in accordance with Table 4.

Figure 9 provides a specific example of the approach for soil pile 'CB.' Its dimensions are 225 x 50 x 5 ft. Applying the 25-ft grid along both the lateral and longitudinal axes and employing 3-ft depth intervals for each location will result in the collection of 36 samples: 18 locations, two depths each. As noted, sample numbers may vary slightly based on pile thickness, and all samples will undergo field analysis. Prior to conducting fieldwork, 10% of the samples will be randomly selected for fixed laboratory analysis in accordance with Table 4.

Table 3b. Addendum 1-B Sample Density for Large Soil Piles

Large Soil Pile Designator:	*Subunit*	*Pile Length (ft):*	*Pile Width (ft)*	*Pile Height (ft)*	*Pile Area (ft2)*	*# Depth Intervals:*	*# Locations:*	*Estimated # of Samples:*
16	4	35	9	2	315	1	2	2
AX	6	40	8	4	320	2	2	4
H	1	50	20	4	1,000	2	2	4
20	4	50	30	5	1,500	2	2	4
CA	4	50	35	8	1,750	3	2	6
CC	4	75	25	3	1,875	1	3	3
BZ	4	75	50	8	3,750	3	6	18
21	4	40	50	8	2,000	3	4	12
CE	4	42	42	10	1,764	4	4	16
M'	2	100	17	3	1,700	1	4	4
J	4	115	55	8	6,325	3	15	45
G	1	117	19	4	2,223	2	5	10
L	1	118	20	3	2,360	1	5	5
D	2	125	25	10	3,125	4	5	20
BW	1	125	30	5	3,750	2	5	10
N	4	213	21	4	4,473	2	9	18
CB	3	225	50	5	11,250	2	18	36
C	1	233	25	10	5,825	4	10	40
BU	4	100	20	4	2,000	2	4	8

Table 3b. Addendum 1-B Sample Density for Large Soil Piles (Continued)

Large Soil Pile Designator:		*Pile Length (ft):*	*Pile Width (ft)*	*Pile Height (ft)*	*Pile Area (ft2)*	*# Depth Intervals:*	*# Locations:*	*Estimated # of Samples:*
						Subtotal:	107	265

Totals (small and large):	
# of Locations:	126
# of Samples:	287
# Fixed Lab Samples:	46
# of Field Measurements:	574

AOC Pile Designators:	*Subunit*	*Pile Length (ft):*	*Pile Width (ft)*	*Pile Height (ft):*	*Pile Area (ft^2)*	*Estimated # Depth Intervals:*	*[1]# Locations:*	*Estimated # of Samples:*
AR (AOC 492)	3	30	15	1	450	1	6	6
O (AOC 541)	3	470	85	3	39,950	1	242	242
						Subtotal:	248	248

Sample Density reflects prescribed 10 foot spacing, (40 *CFR* 761.265 Subpart N) for characterization of PCB bulk remediation wastes and porous surfaces

Totals (AOC 492 & 541):	
# of Locations:	242
# of Samples:	242
Fixed Lab Samples:	24
# of Field Measurements:	484

Table 4. Addendum 1-B Fixed Laboratory Requirements

Characterization Parameters	Analytical Method
PCBs (Aroclors/Total)	EPA 3540/8082
Inorganic Target Analyte List (Total Metals)	EPA 6010 or EPA 6020
^{241}Americium	DOE EML HASL-300, Am-05-RC
^{60}Cobalt	EML HASL 300, 4.5.2.3.
^{237}Neptunium	DOE EML HASL 300
^{238}Plutonium	DOE EML HASL-300, Pu-11-RC
$^{239/240}$Plutonium	DOE EML HASL-300, Pu-11-RC
^{99}Technetium	DOE EML HASL-300, Tc-02-RC
^{228}Thorium	DOE EML HASL-300, Th-01-RC
$^{230/232}$Thorium	DOE EML HASL-300, Th-01-RC
Total Uranium	DOE EML HASL-300, U-02-RC
^{234}Uranium	DOE EML HASL-300, U-02-RC
^{235}Uranium radioactivity	DOE EML HASL-300, U-02-RC
^{238}Uranium	DOE EML HASL-300, U-02-RC
Arsenic	EPA 1311/6010 or 6020
Barium	EPA 1311/6010 or 6020
Cadmium	EPA 1311/6010 or 6020
Chromium	EPA 1311/6010 or 6020
Lead	EPA 1311/6010 or 6020
Mercury	EPA 1311/7470
Selenium	EPA 1311/6010 or 6020
Silver	EPA 1311/6010 or 6020
Ignitability	EPA 1030
Reactivity Cyanide	EPA 9014
Reactivity Sulfide	EPA 9034
Corrosivity to Steel	EPA 1110
Paint Filter Test	EPA 9095B
%Moisture/%Solid	ASTM D2216

ASTM = American Society for Testing and Materials
SVOC = semivolatile organic compound

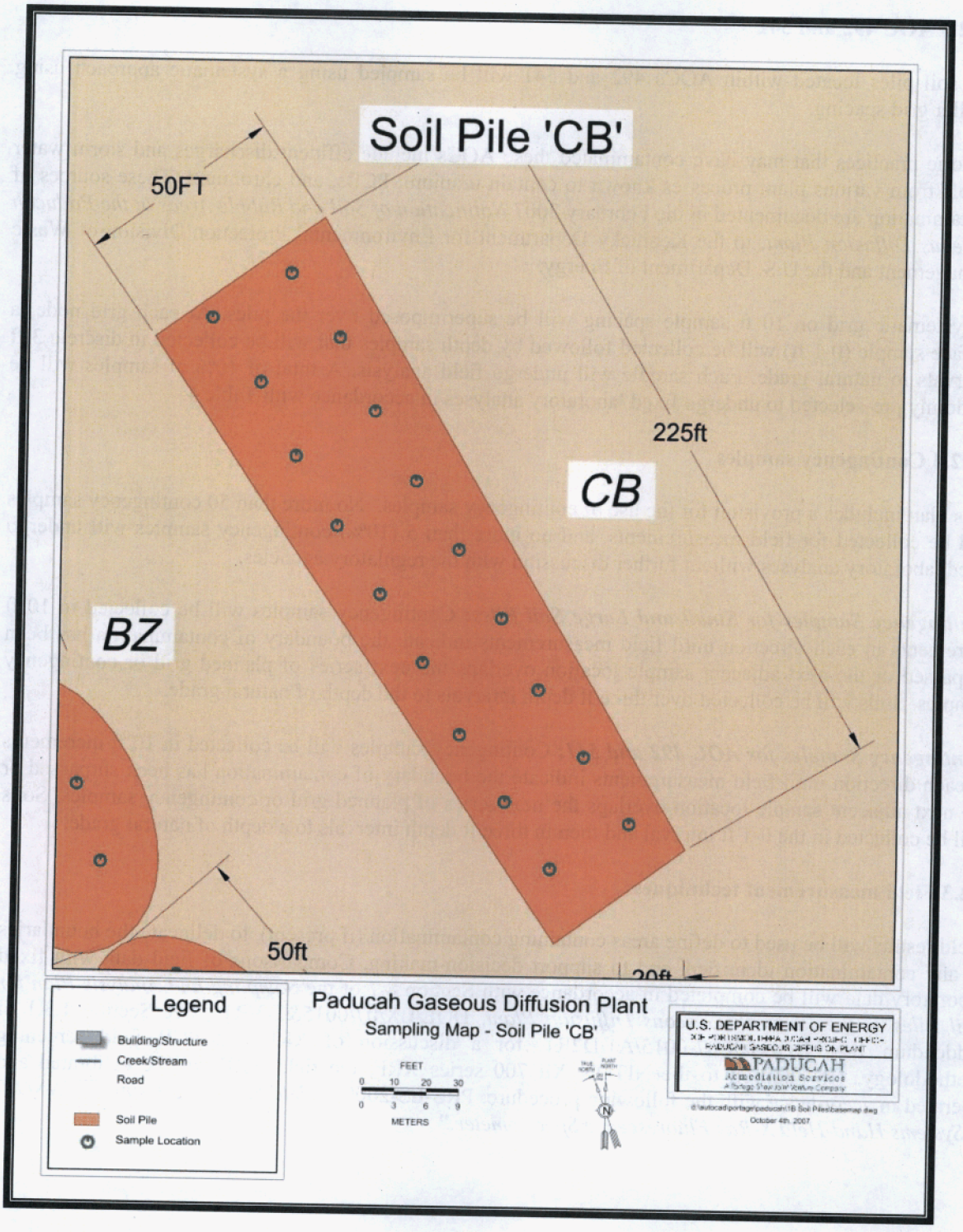

Figure 9. Soil Pile 'CB' Sampling Map

1.2.2.3 AOC 492 and 541

The soil piles located within AOCs 492 and 541 will be sampled using a systematic approach using smaller grid spacing.

Historic practices that may have contaminated these AOCs include effluent discharges and storm water runoff from various plant processes known to contain uranium, PCBs, and chromium. These sources of contamination are documented in the February 2007 *Notification of Soil and Rubble Areas at the Paducah Gaseous Diffusion Plant*, to the Kentucky Department for Environmental Protection/Division of Waste Management and the U.S. Department of Energy.

A systematic grid on 10 ft sample spacing will be superimposed over the piles. At each grid node, a surface sample (0-1 ft) will be collected followed by depth samples that will be collected in discrete 3 ft intervals to natural grade. Each sample will undergo field analysis. A total of 10% of samples will be randomly pre-selected to undergo fixed laboratory analyses in accordance with Table 4.

1.2.2.4 Contingency samples

This plan includes a provision for the use of contingency samples. No more than 50 contingency samples will be collected for field measurements, and no more than 5 (10%) contingency samples will undergo fixed laboratory analyses without further discussion with the regulatory agencies.

Contingency Samples for Small and Large Soil Piles: Contingency samples will be collected in 10 ft increments in each direction until field measurements indicate the boundary of contamination has been surpassed or the next adjacent sample location overlaps the next series of planned grid or contingency samples. Soils will be collected over three ft depth intervals to the depth of natural grade.

Contingency Samples for AOC 492 and 541: Contingency samples will be collected in 10 ft increments in each direction until field measurements indicate the boundary of contamination has been surpassed or the next adjacent sample location overlaps the next series of planned grid or contingency samples. Soils will be collected in the 0-1 ft interval and then in three ft depth intervals to a depth of natural grade.

1.2.3 Field measurement techniques

Field results will be used to define areas containing contamination (if present), to delineate the boundaries of any contamination identified, and to support decision-making. Comparisons of field data with fixed laboratory data will be completed in accordance with Section 8.7 of the *Sampling and Analysis Plan for Soil Piles at the Paducah Gaseous Diffusion Plant,* DOE/LX/07/0015&D2/R1. See Section 1.3.1 of Addendum 1-A, DOE/LX/07-0015/A1/D2R1, for a discussion of XRF and PCB field screening methodology. In addition to the NITON Xli 700 series XRF, the field XRF will be calibrated and operated in accordance with the following procedure: PRS-ES-2000, "*Field Screening Using an INNOV-X Systems Hand-Held X-Ray Fluorescence Spectrometer.*"

1.2.4 Sample collection summary

Table 5 provides specific numbers of samples planned for each soil pile and specifies the numbers of field and laboratory analyses to be performed. The soil pile dimensions and corresponding sample numbers are based on the best available information. Because soil pile thickness may vary throughout the study area, the total number of samples collected may vary slightly based on actual field conditions.

Table 5. Summary of Planned Samples Addendum 1-B Soil Piles

Small Soil Piles	[1]Estimated # of Samples	Large Soil Piles	[1]Estimated # of Samples
Field Measurements	44	Field Measurements	530
Fixed Lab	19	Fixed Lab	27
AOC 492 & 541	**[1]Estimated # of Samples**	**Total**	**[1]Estimated # of Samples**
Field Measurements	484	Field Measurements	1058
Fixed Lab	24	Fixed Lab	70

[1]Field measurement estimate equals number of soil interval samples collected multiplied by two field test methods (PCBs and ISOCS). Fixed lab equals 10% of randomly preselected soil interval samples.

1.2.5 Technical justification

As a result of the large area covered by the soil piles and the large variation in pile size, a systematic sampling approach has been developed. It is designed to ensure that data is acquired from all soil piles, irrespective of their size, while ensuring that a sufficient number of samples are acquired to support informed decision making. To develop the sampling strategy, practices previously approved at PGDP have been consulted and form the basis for the sampling design.

The recently completed Surface Water Operable Unit On-Site SAP and the companion addenda to this plan, Addendum 1-A and Addendum 2, contain provisions for sample density in similar settings. Each has employed sample spacing ranging from 10 ft to 50 ft as a means of identifying contamination and delineating hot spot contamination. These correspond to hot spot areas ranging from 1,225 ft^2 to 2,500 ft^2. Generally, sample spacing from 35 ft to 50 ft has been accepted for initial data acquisition, with tighter spacing applied to delineate contamination boundaries.

Addendum 1-B is consistent with these historical approaches in that it will apply a slightly more conservative 25 ft sample spacing as a means of determining if contamination is present. If required, contingency samples will be collected using 10 ft spacing to delineate contaminant boundaries. To achieve this objective, systematic sampling will be conducted throughout the soil column on each pile. Small piles will undergo sampling at a single location. Multiple intervals will be acquired at each location where soil pile thickness is greater than 3 ft. Large soil piles will undergo sampling on a systematic, random 25 ft sample grid. This spacing was adopted to accommodate the dimensions of the Addendum 1-B large soil piles, which generally are elongated in multiples of 25 (Table 3).

The approach for Addendum 1-B soil piles is in keeping with industry standard guidance as well. As noted, the only currently identified contamination is data acquired from biased sampling in 2001 and 2002

at AOCs 492 and 541. The Addendum 1-A sampling effort has shown little detectible contamination in nearby Soil Pile 1. Based on this, the Addendum 1-B soil piles (with the exception of Subunit 3 and AOCs 492 and 541) meet the requirements of a Class II Area as defined by MARSSIM and NUREG-5849, which define Class II Areas as, "*areas that have the potential for contamination or known contamination, but are not expected to exceed the cleanup levels*" (MARSSIM 2000). MARSSIM/NUREG-5849 prescribe sample spacing at 10 m (32.8 ft) as sufficient to determine if contamination is present. Use of a sampling grid utilizing 25 ft lateral and longitudinal spacing for initial data gathering and use of 10 ft spacing to delineate contamination boundaries meets these requirements.

Because of the known historic contamination at AOCs 492 and 541, a more aggressive sampling approach is planned. Similar to Addendum 1-A, a systematic 10 ft grid will be used to characterize Subunit 3 soil piles, and contingency sampling will be employed if necessary to define the extent of hot spots. In addition, sampling will be segregated by surface and subsurface sampling. This will include discrete surface samples collected from 0-1 ft and depth samples collected over each 3-ft interval of soil column, until the natural grade is reached. 40 *CFR* § 761.265, *Sampling Bulk PCB Remediation Waste and Porous Surfaces*, (a) states: "Use a grid interval of 3 meters and the procedures in §761.283 and 761.286 to sample bulk PCB remediation waste that is not in a container and porous surfaces." The 10 ft sampling grid proposed for Subunit 3 soil piles is consistent with Subpart N regulations

1.3 SOIL PILE SAMPLE REQUIREMENTS

The following sections specify the requirements for Addendum 1-B soil pile sample collection.

1.3.1 Small soil piles

Prior to the collection of soil samples, each small Addendum 1-B soil pile will be visited to determine the necessity for clearing and grubbing. Following any required site preparations, the highest point of each small soil pile will be identified, staked, and surveyed using GPS. This location will serve as the primary sample collection point for small soil piles. Core samples will be collected from each three ft interval of soil pile using a portable DPT core sampler. Each soil sample will be initiated at the upper vertical horizon of the soil pile and advanced at 3 ft increments down to the natural grade. If required, contingency samples will be collected in accordance with previous sections.

Note: For both small and large soil piles, soil cores will be advanced at 3-ft intervals at each location, until the interface with the soil pile and the natural grade has been reached. For any soil interval, where the span to the natural grade is less than 3 ft, the sampler will be halted when the natural grade is reached, irrespective of its length. Multiple cores over this span may be collected to acquire sufficient sample volume for field and laboratory analyses. If multiple cores are required, they will be combined and homogenized before they are placed in containers for analysis.

1.3.2 Large soil piles

Following any required site preparations, the 25 ft sample grid will be applied to the soil pile, in accordance with the soil pile-specific sampling map provided in the appendix. Each location will be located by measuring sample locations in 25 ft increments using a tape measure, staked, and surveyed using a GPS.

Following placement of the sample grid, sample collection, handling, and all corresponding requirements will be satisfied using the provisions defined for small soil piles in the preceding section. If required, contingency samples will be collected in accordance with previous sections.

Note: Sample locations for large soil piles may be adjusted at the discretion of the project manager and field team leader, if actual field conditions indicate a predetermined sample location or locations that fall outside the boundaries of a soil pile. If a given location is moved, the reasoning for the move along with its spacing in relation to adjacent locations will be fully documented in the field logbook. No sample location shall be moved such that spacing between adjacent locations is less than 10 ft.

1.3.3 AOCs 492 and 541

Prior to the collection of soil samples, each soil pile within AOCs 492 and 541 will be visited to determine the necessity for clearing and grubbing. Following any required site preparations, the 10 ft sample grid will be applied to the soil pile, in accordance with the soil pile-specific sampling map provided in Appendix A. Each location will be located by measuring sample locations in 10 ft increments using a tape measure, staked, and surveyed using a GPS.

Following placement of the sample grid, sample collection, handling, and all corresponding requirements will be satisfied as noted previously and in accordance with the SAP. If required, contingency samples will be collected in accordance with previous sections.

Note: Sample locations for AOC 492 and 541 soil piles may be adjusted at the discretion of the project manager or field team leader under conditions as explained in the Note above. No sample location shall be moved such that spacing between adjacent locations is less than 4 ft.

1.3.4 Contingency samples

Contingency Samples for Small and Large Soil Piles: The field team leader will measure four equidistant locations from the center of the contaminated location, on 10 ft centers. Each contingency location will be staked and then GPS surveyed. Field samples will be collected from each location, at depths corresponding to the depth(s) at which contamination was found in the original sample. Each interval will undergo field measurements for those constituents found to be elevated in the original sample (metals, and/or PCBs) in accordance with Section 1.2.3 – Field Measurements.

Using the field results, the project manager and field team leader will determine if the contaminant boundary has been reached, as indicated by a substantial decrease or non-detect results in the corresponding contingency samples. If a significant reduction in contaminant results is not observed, a second set of contingency samples will be collected. These will be spaced on 10 ft centers from the original set of contingency samples. Each will undergo field measurements for those constituents found to be elevated in the adjacent samples. If contingency samples are required, 10% will be randomly pre-selected for fixed laboratory analyses. Analyses will focus on those constituents measured in excess of risk-based/regulatory thresholds. No more than two sets of contingency samples will be collected for any single location.

Contingency Samples for AOC 492 and 541: Contingency sampling for AOC 492 and 541 will be performed if field sampling indicates that the temporal extent of contamination has not been defined within the pile sampling grid boundary. Contingency sampling will consist of sampling on 10 ft centers equidistant from the pile sample grid centers. Contingency samples will be collected until nondetects are observed or up to the AOC boundary as defined in the Solid Waste Management Unit Assessment Report.

Note: No more than 50 contingency samples are planned for Addendum 1-B. Should field conditions warrant additional contingency sampling, PRS will notify DOE and the regulatory agencies.

1.4 FIELD QUALITY CONTROL SAMPLES

Field quality control samples for Addendum 1-B will be collected in accordance with the SAP, and an estimated number of samples are noted in Table 6.

Table 6. Addendum 1-B Field Quality Control Samples

Analysis Type:	# of Field Duplicates	# of Field Blanks	# of Equipment Rinsates
Field Measurements	43	N/A	N/A
Fixed Lab	4	4	4

1.5 SOIL ANALYSES

The following lists the general analytical requirements for Addendum 1-B soils. Table 4 outlines the specific analyses and analytical methods for each analysis type. The corresponding laboratory statement of work will delineate all details relating to analysis of these constituents.

- SVOCs
- PCBs
- Radionuclides
- Target Analyte List metals.

1.5.1 TCLP Analyses

Toxicity Characteristic Leaching Procedure (TCLP) analyses will be limited to a maximum of 10 samples. Please see Addendum 1-A, Section 1.5.2, for further discussion on TCLP analysis. The contract laboratory will be informed by the sample management office laboratory coordinator which samples shall be extracted and analyzed using the TCLP provisions.

APPENDIX

SOIL PILE-SPECIFIC SAMPLING MAPS

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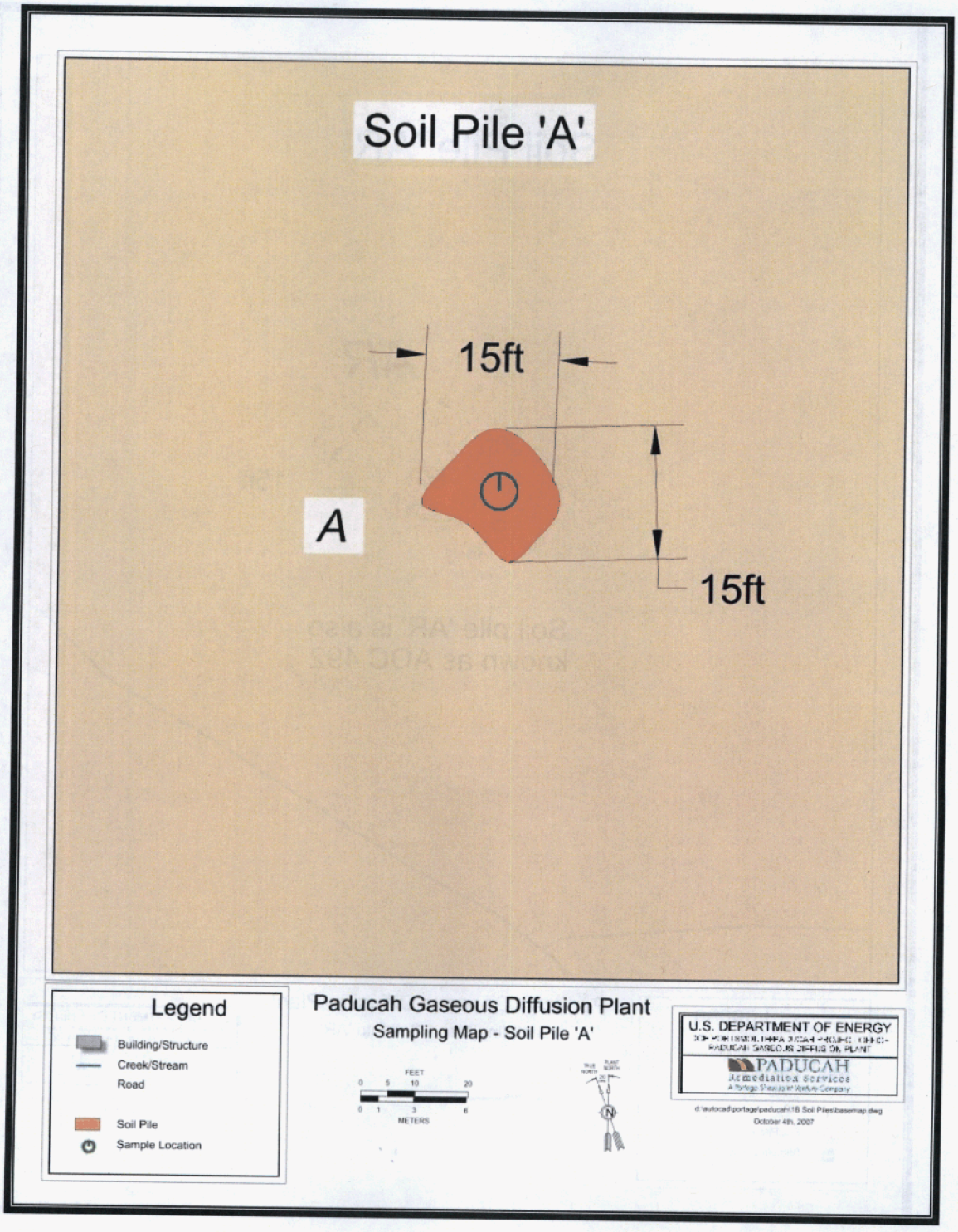
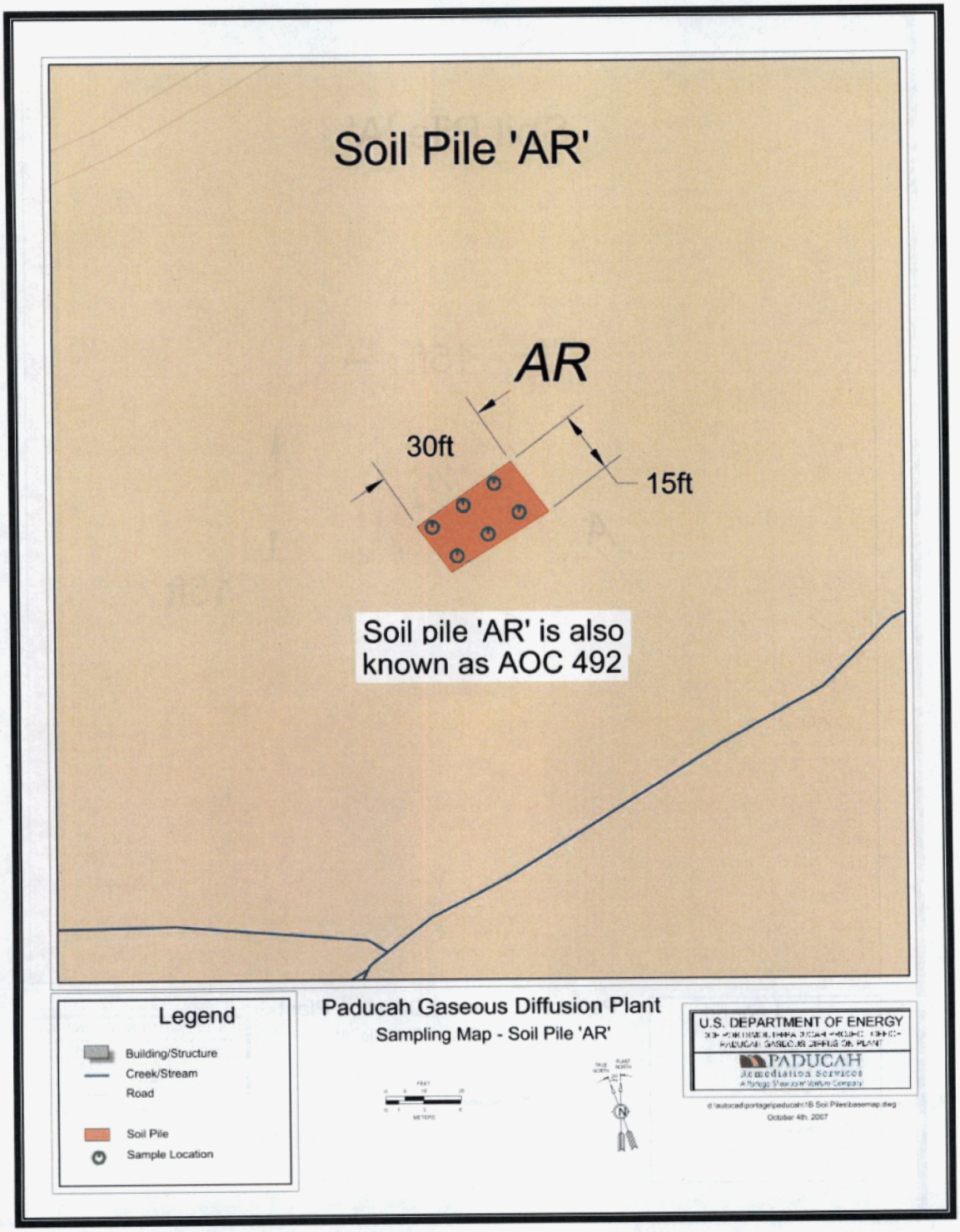

Soil Pile 'A'
15ft
A
15ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'A'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


Soil Pile 'AR'
AR
30ft
15ft
Soil pile 'AR' is also known as AOC 492
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'AR'
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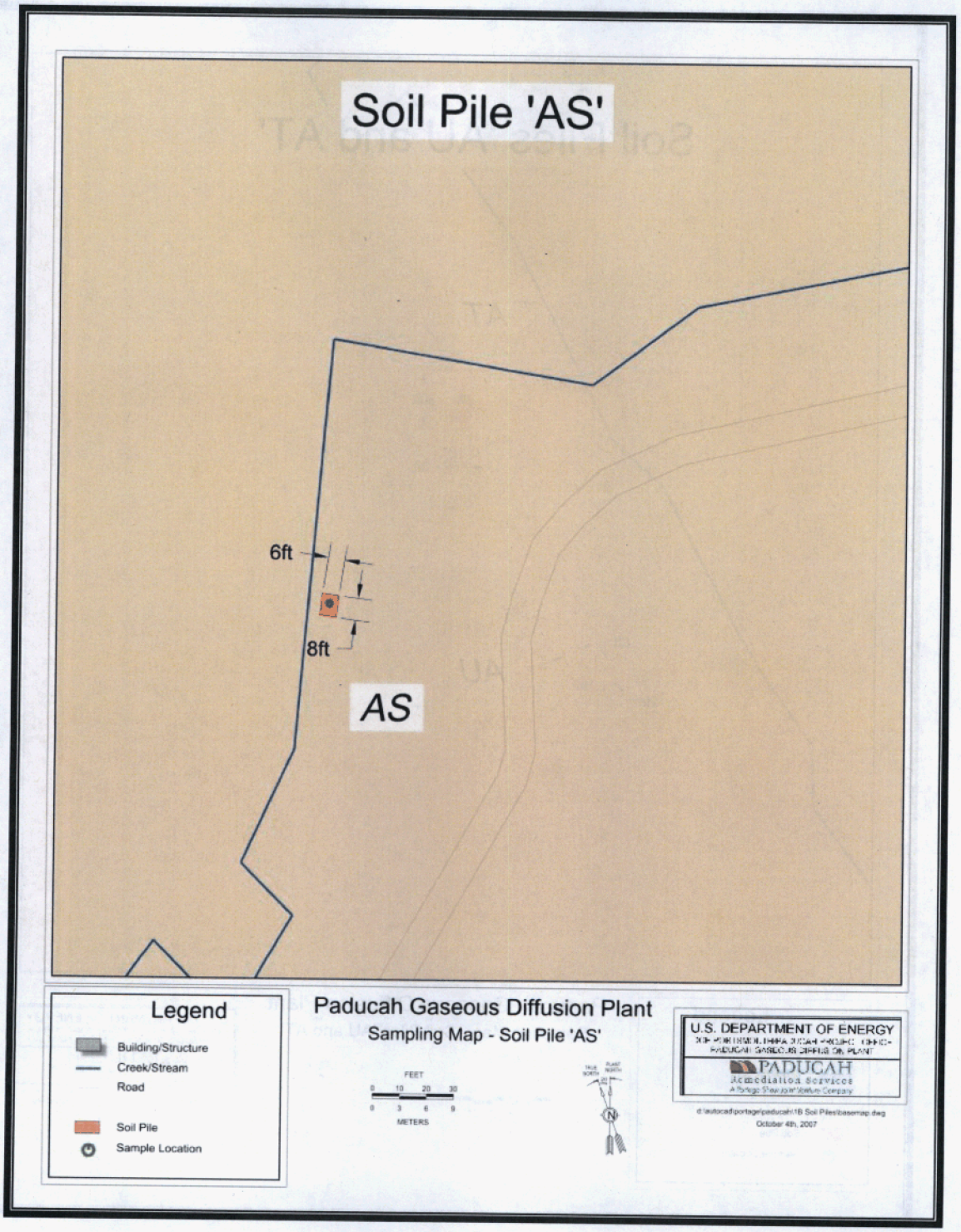
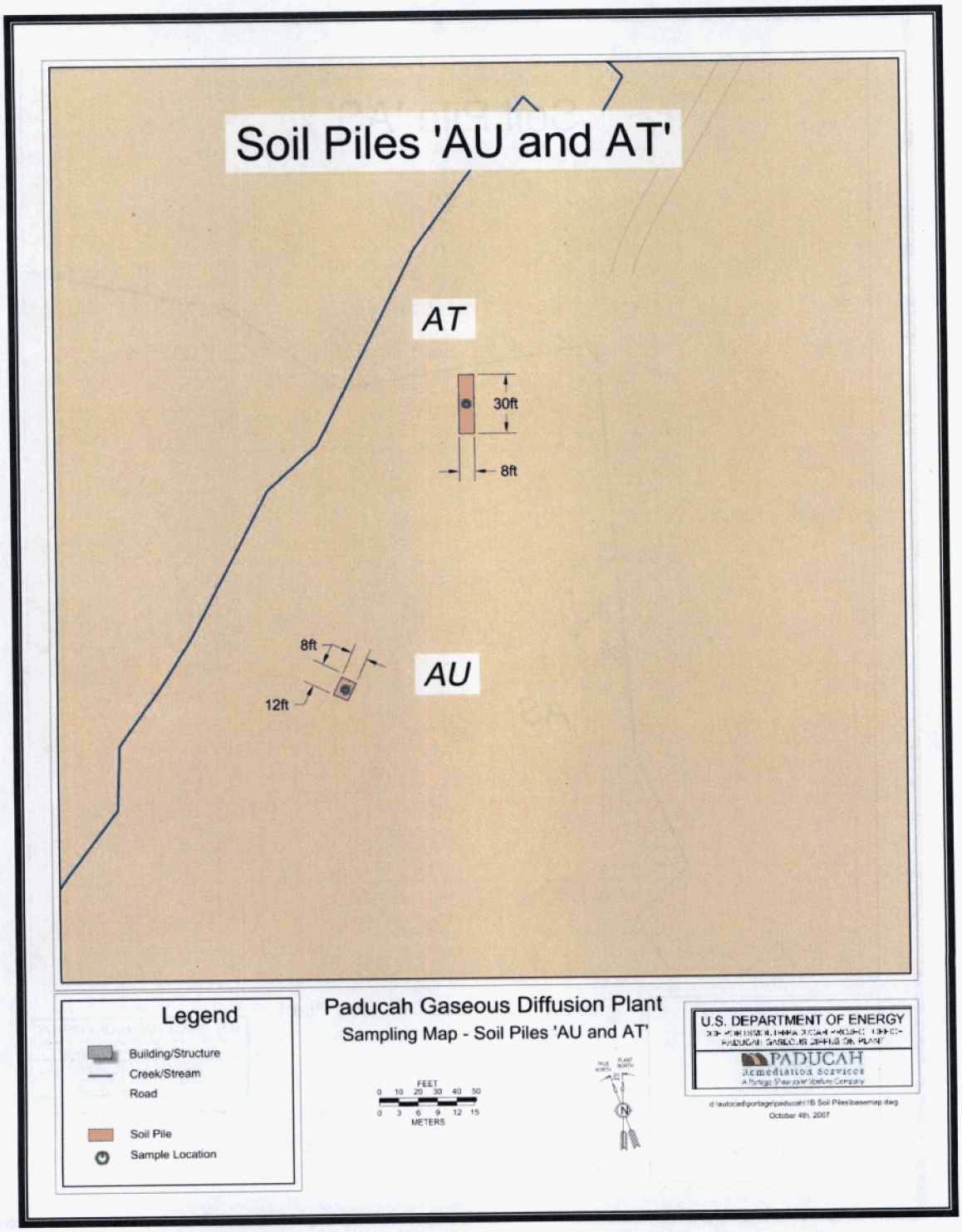
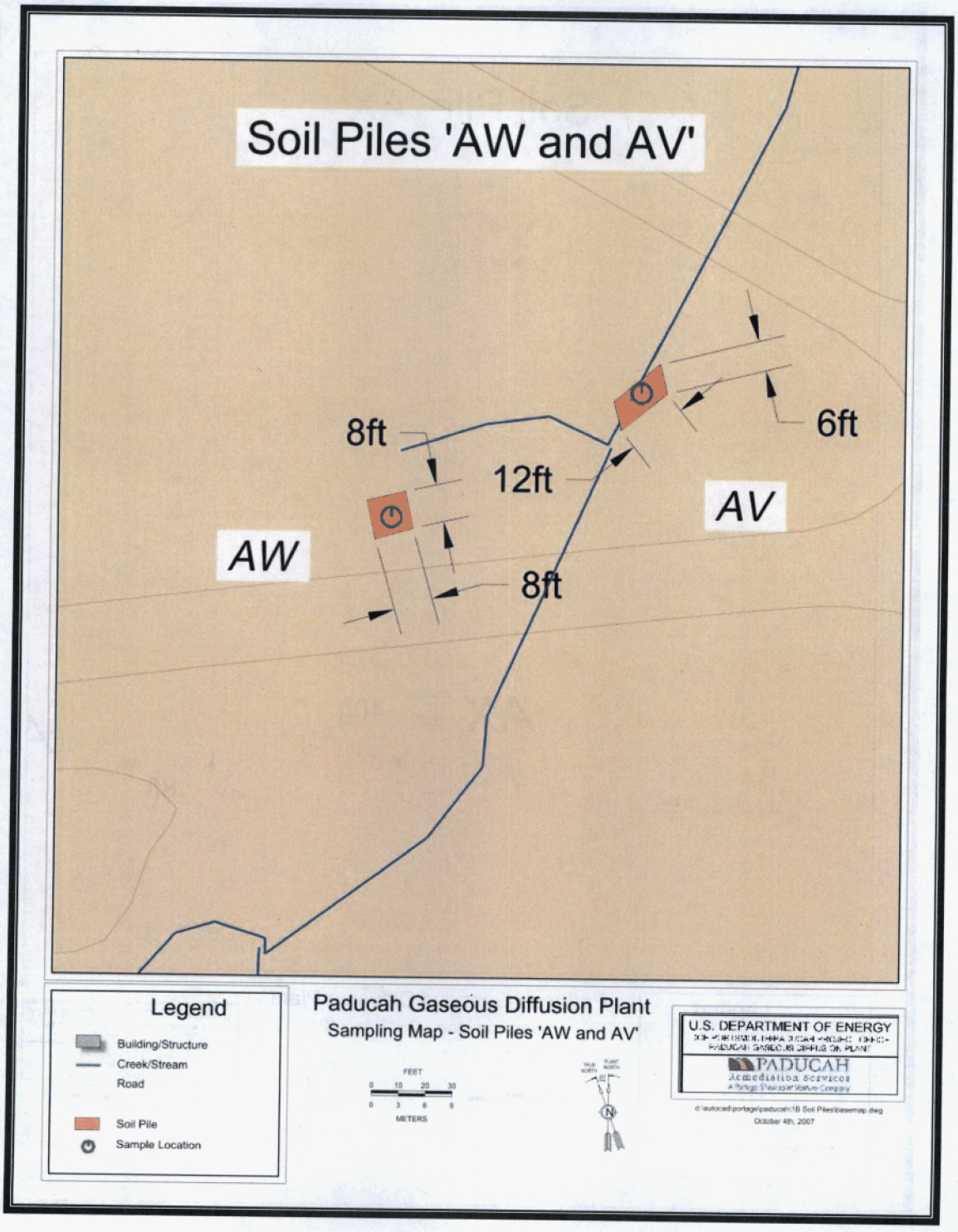
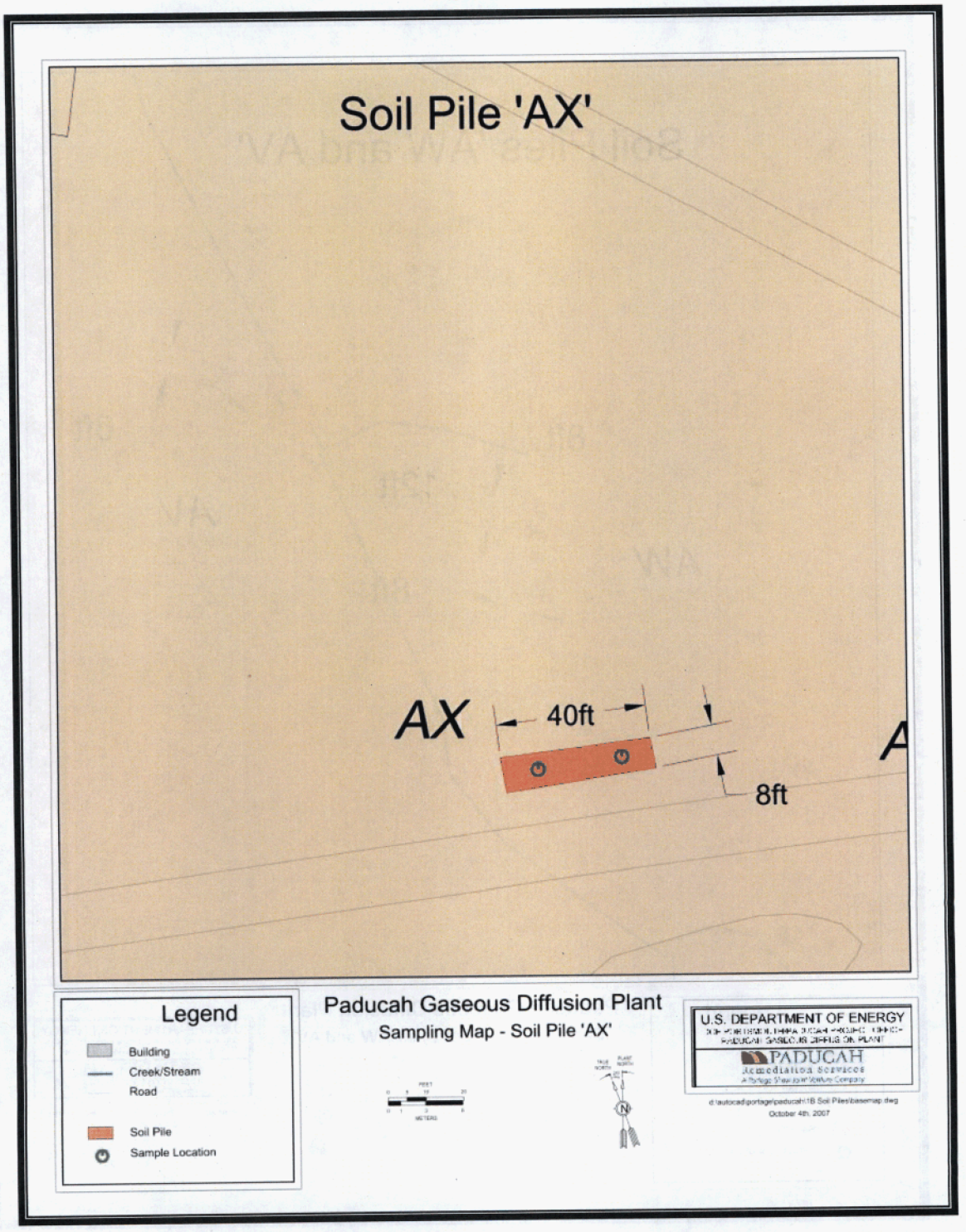

Soil Pile 'AS'
6ft
8ft
AS
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'AS'
FEET
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007


Soil Piles 'AU and AT'
AT
30ft
8ft
8ft
12ft
AU
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'AU and AT'
FEET
0 10 20 30 40 50
0 3 6 9 12 15
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


Soil Piles 'AW and AV'
8ft
12ft
8ft
6ft
AW
AV
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'AW and AV'
FEET
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007


Soil Pile 'AX'
AX
40ft
8ft
A
Legend
Building
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'AX'
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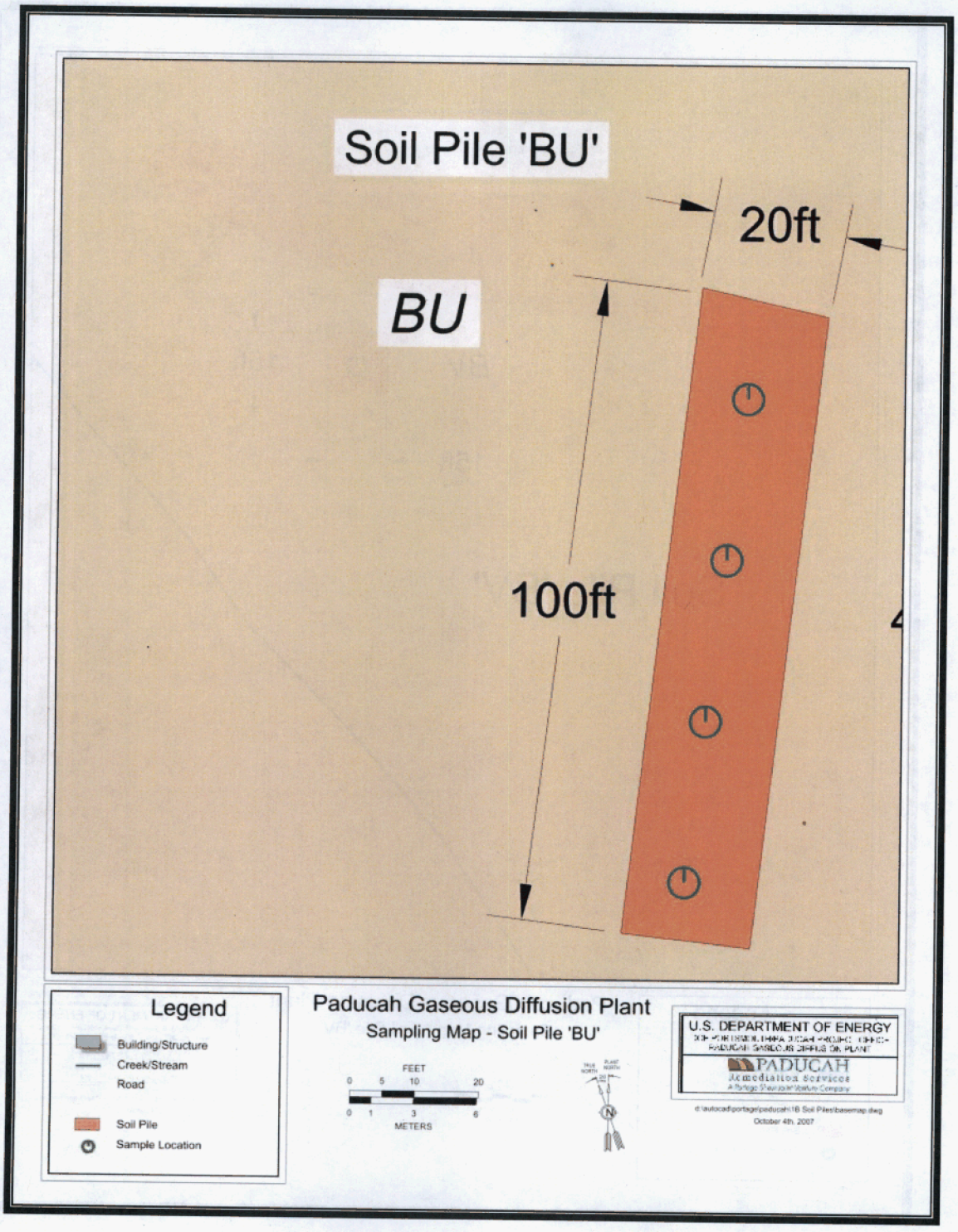
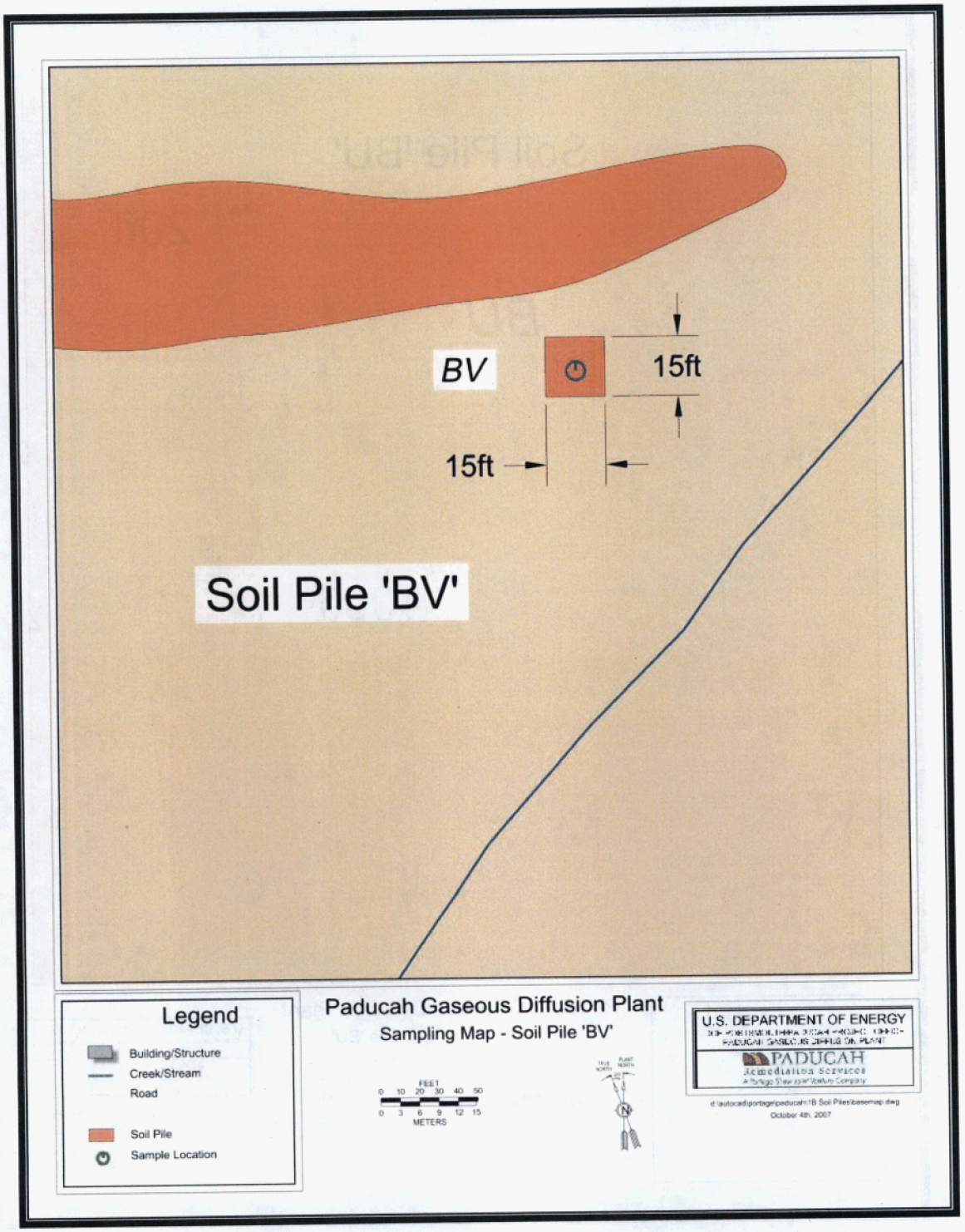
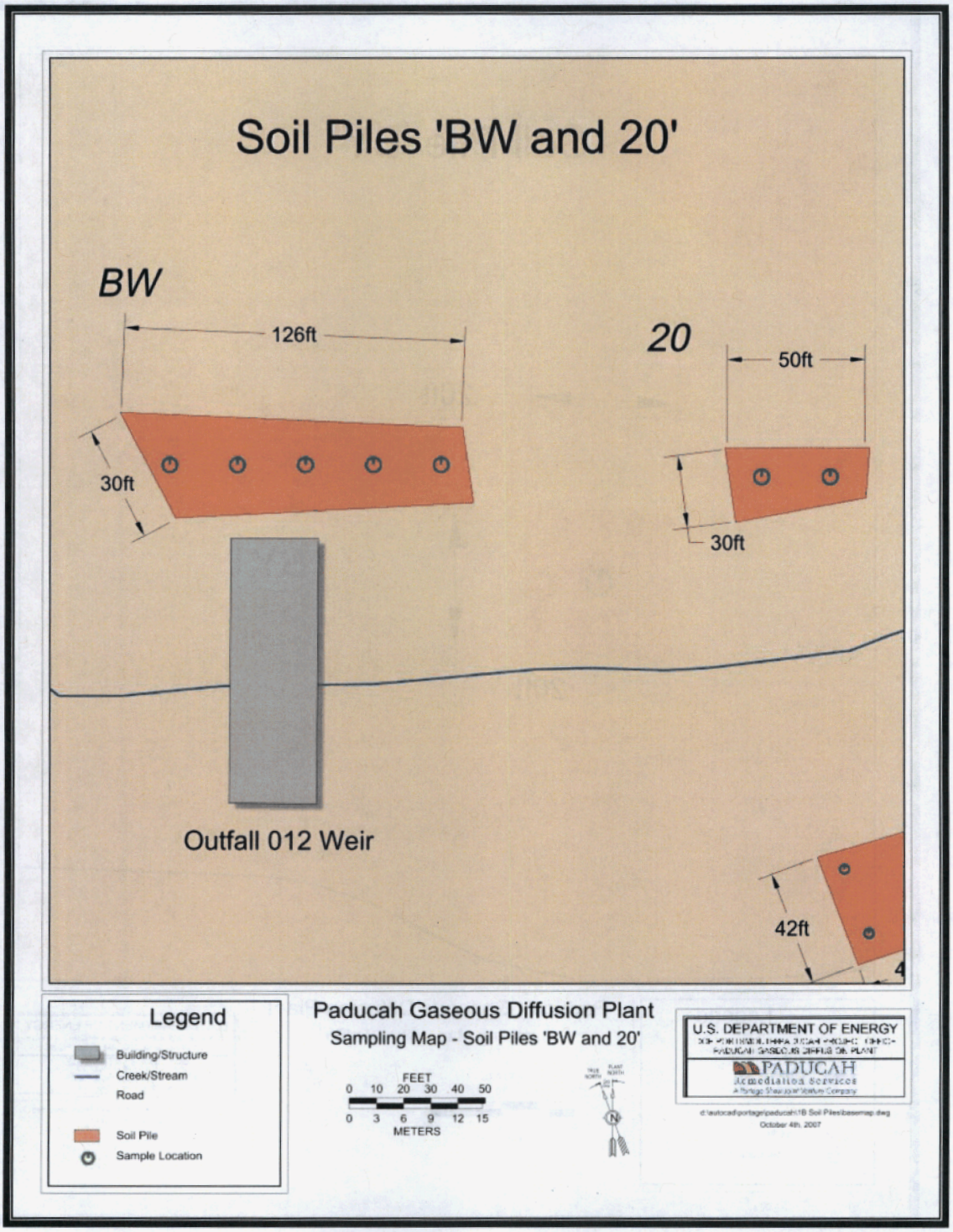
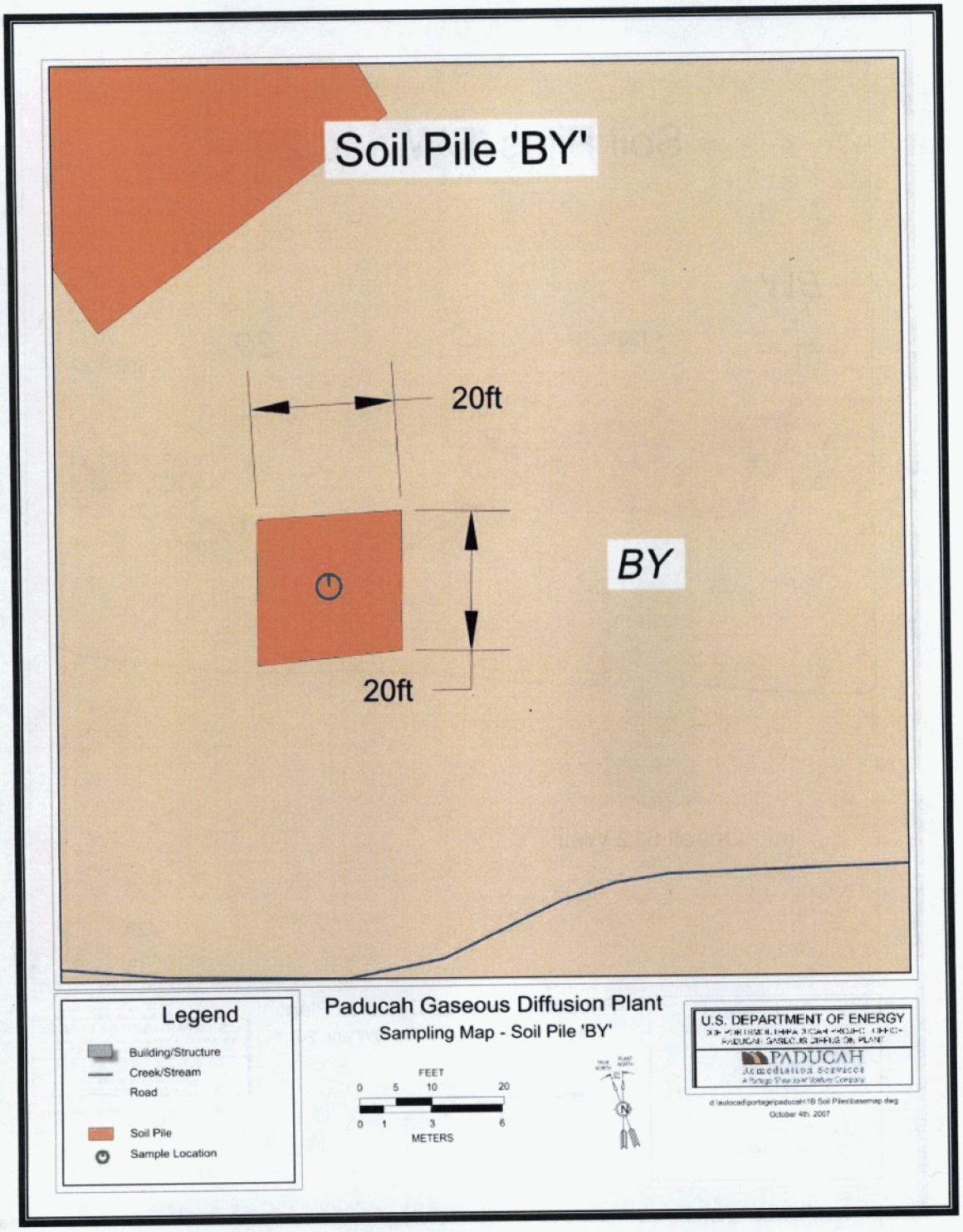
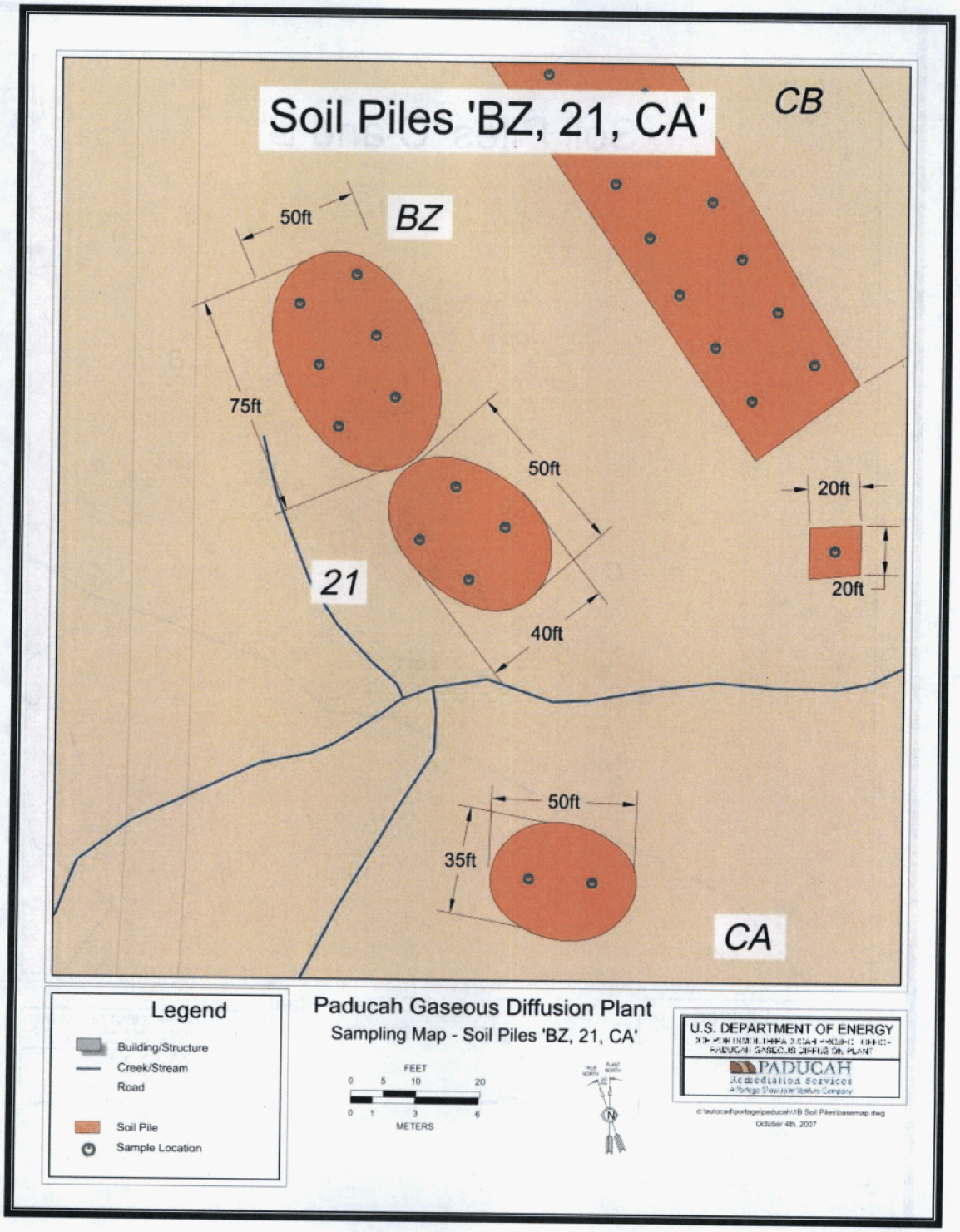
October 4th, 2007

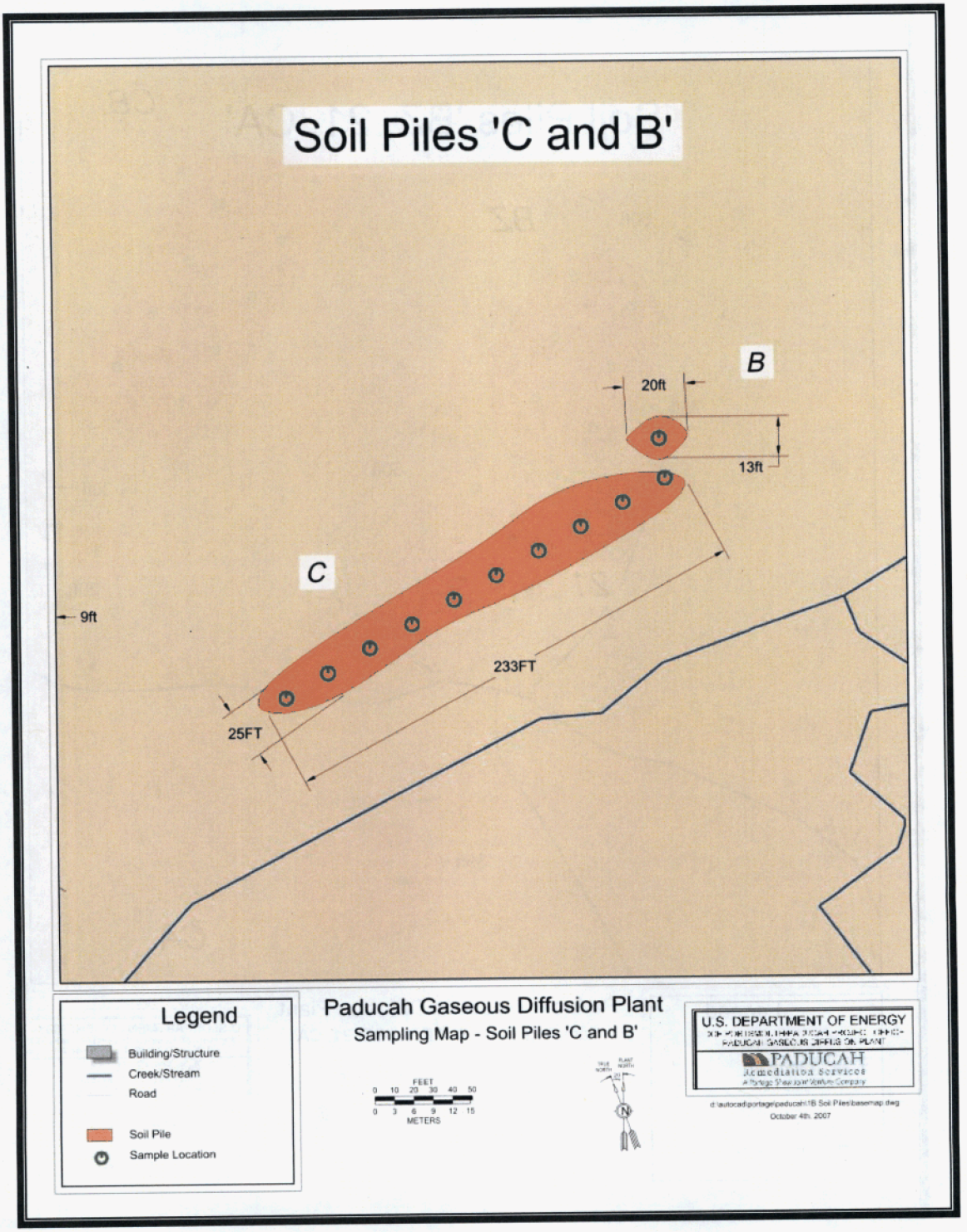

Soil Pile 'BU'
20ft
BU
100ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'BU'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

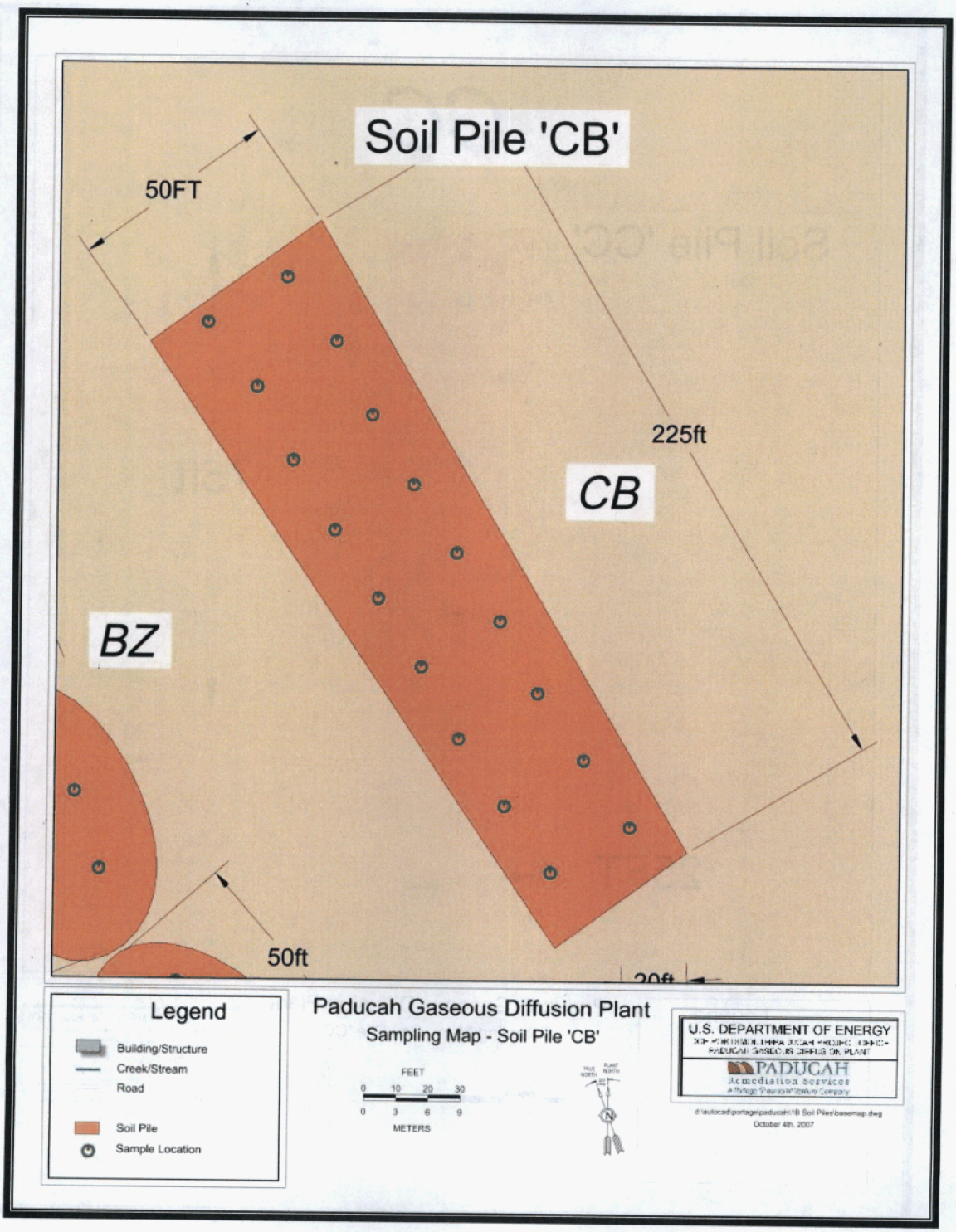

BV
15ft
15ft
Soil Pile 'BV'
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'BV'
FEET
0 10 20 30 40 50
0 3 6 9 12 15
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007

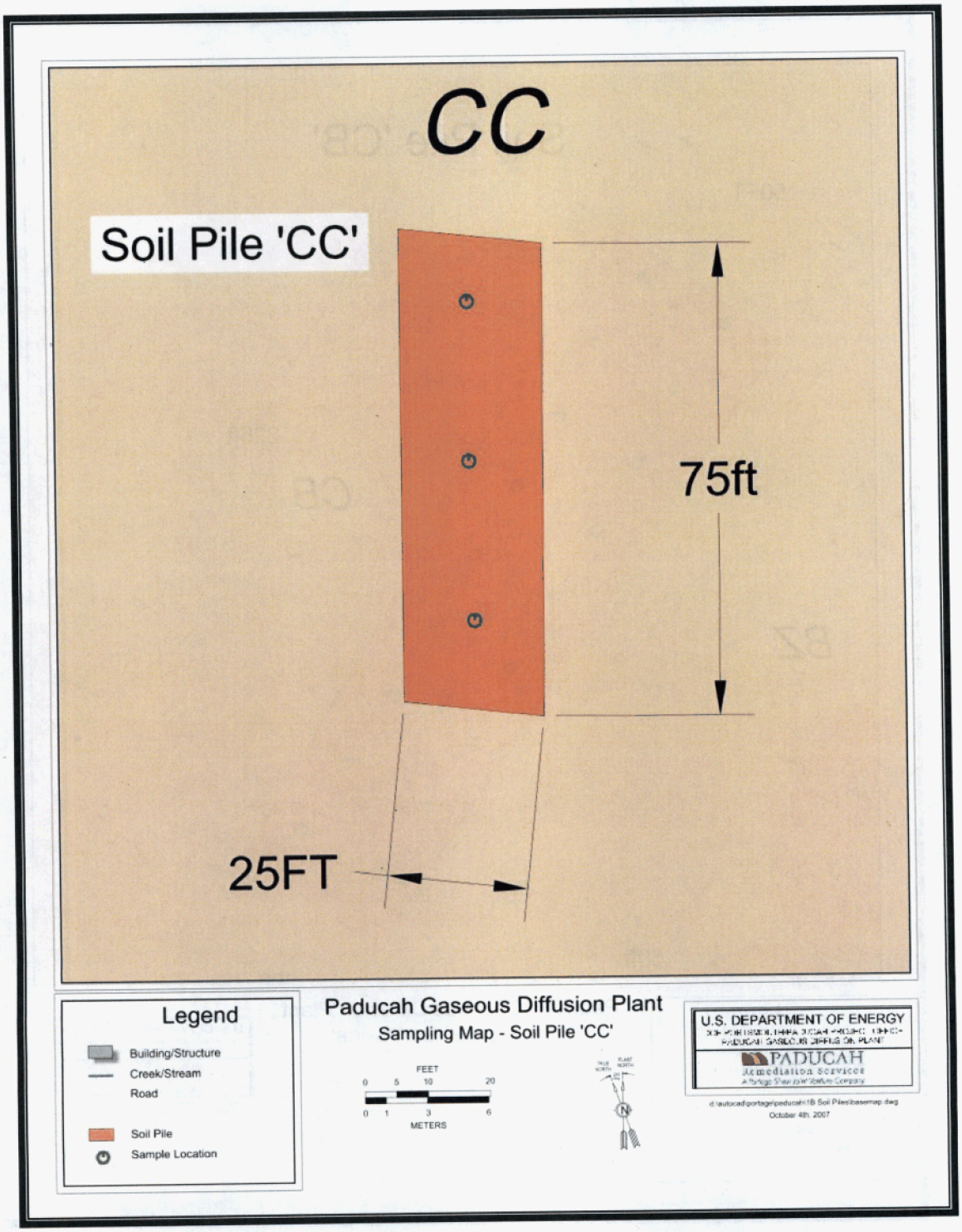

Soil Piles 'BW and 20'
BW
126ft
30ft
20
50ft
30ft
Outfall 012 Weir
42ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'BW and 20'
FEET
0 10 20 30 40 50
0 3 6 9 12 15
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

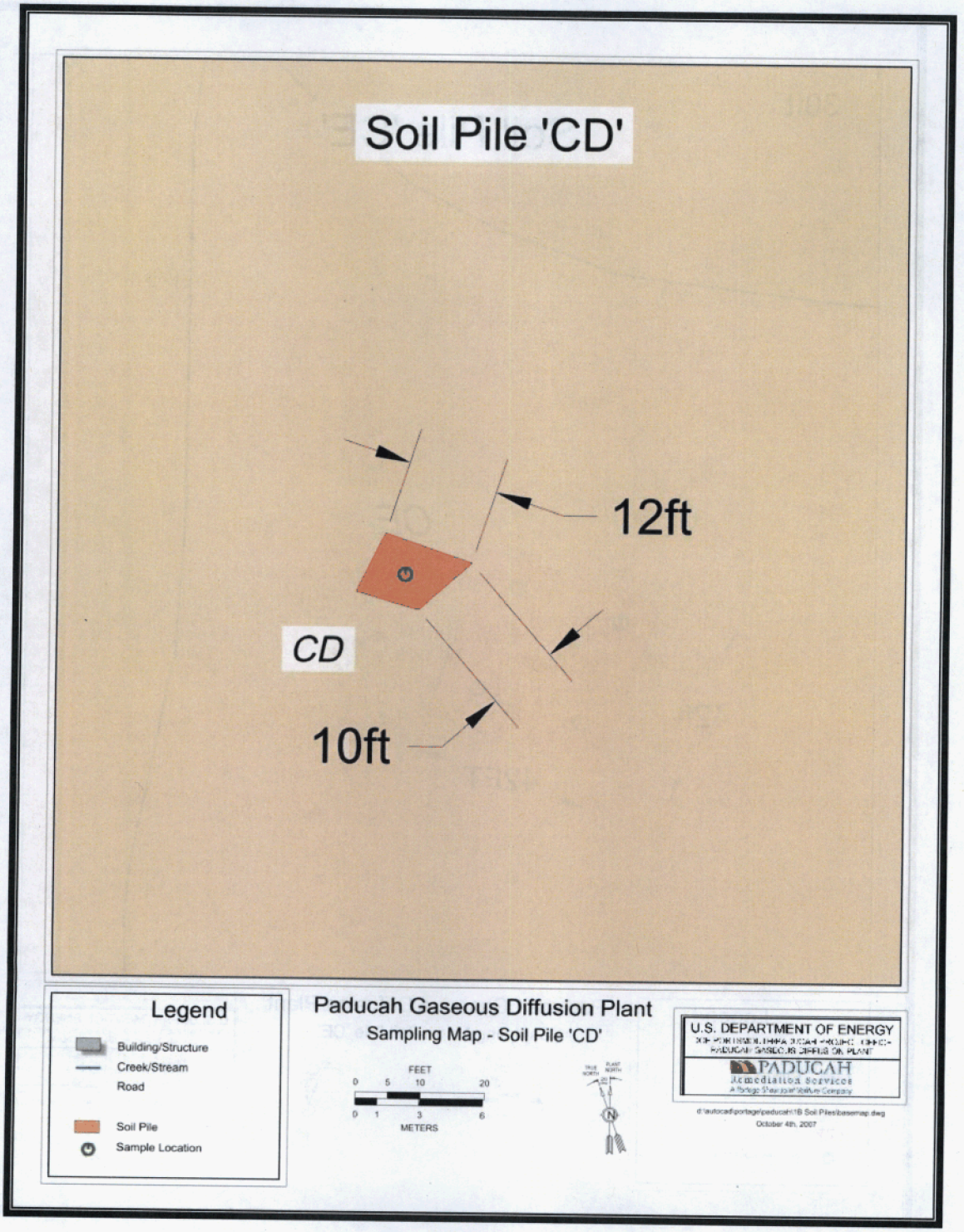

Soil Pile 'BY'
20ft
20ft
BY
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'BY'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

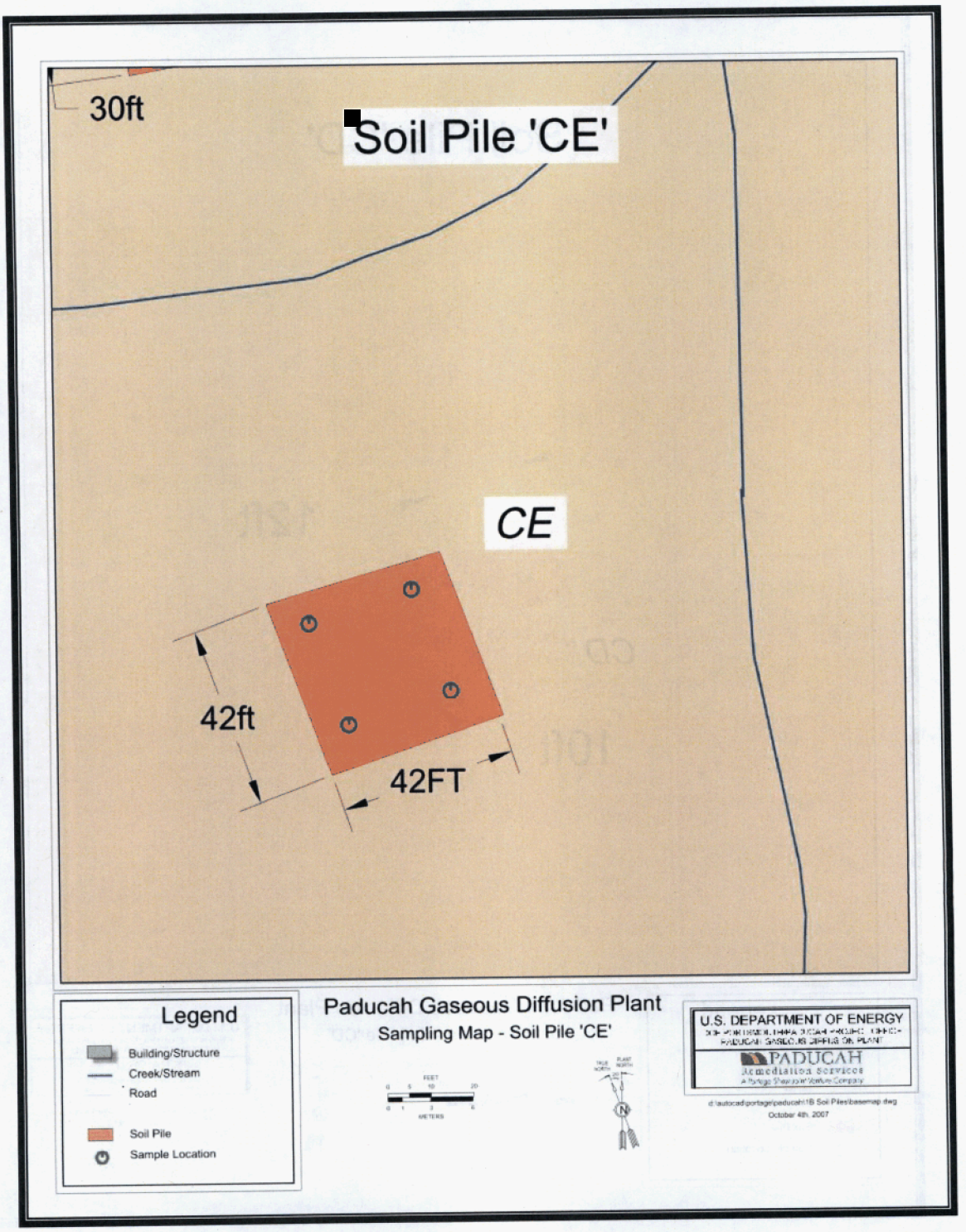

Soil Piles 'BZ, 21, CA'
CB
BZ
50ft
75ft
50ft
21
40ft
20ft
20ft
50ft
35ft
CA
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'BZ, 21, CA'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007

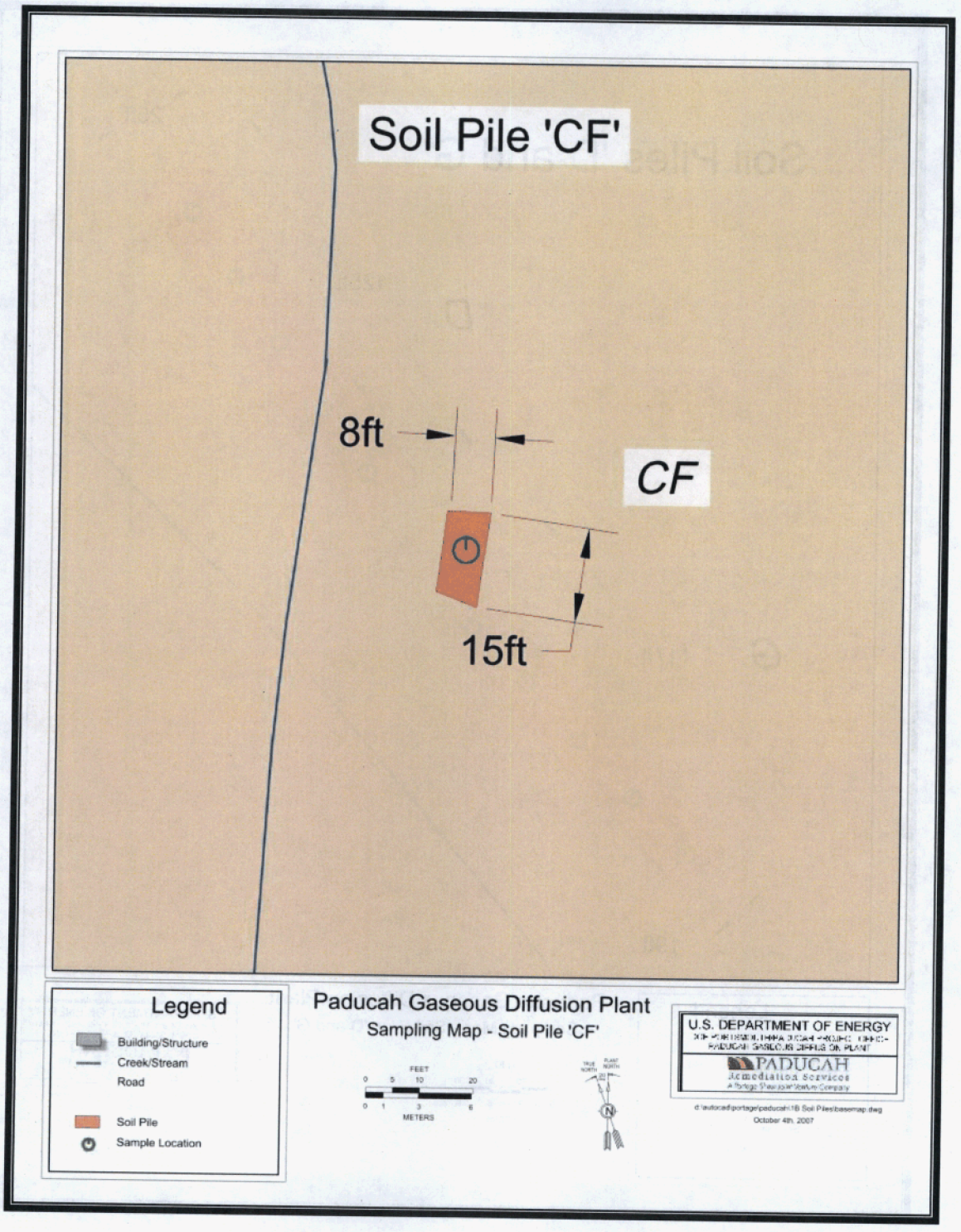

Soil Piles 'C and B'
B
20ft
13ft
C
9ft
233FT
25FT
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'C and B'
FEET
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Accelerated Services
October 4th, 2007

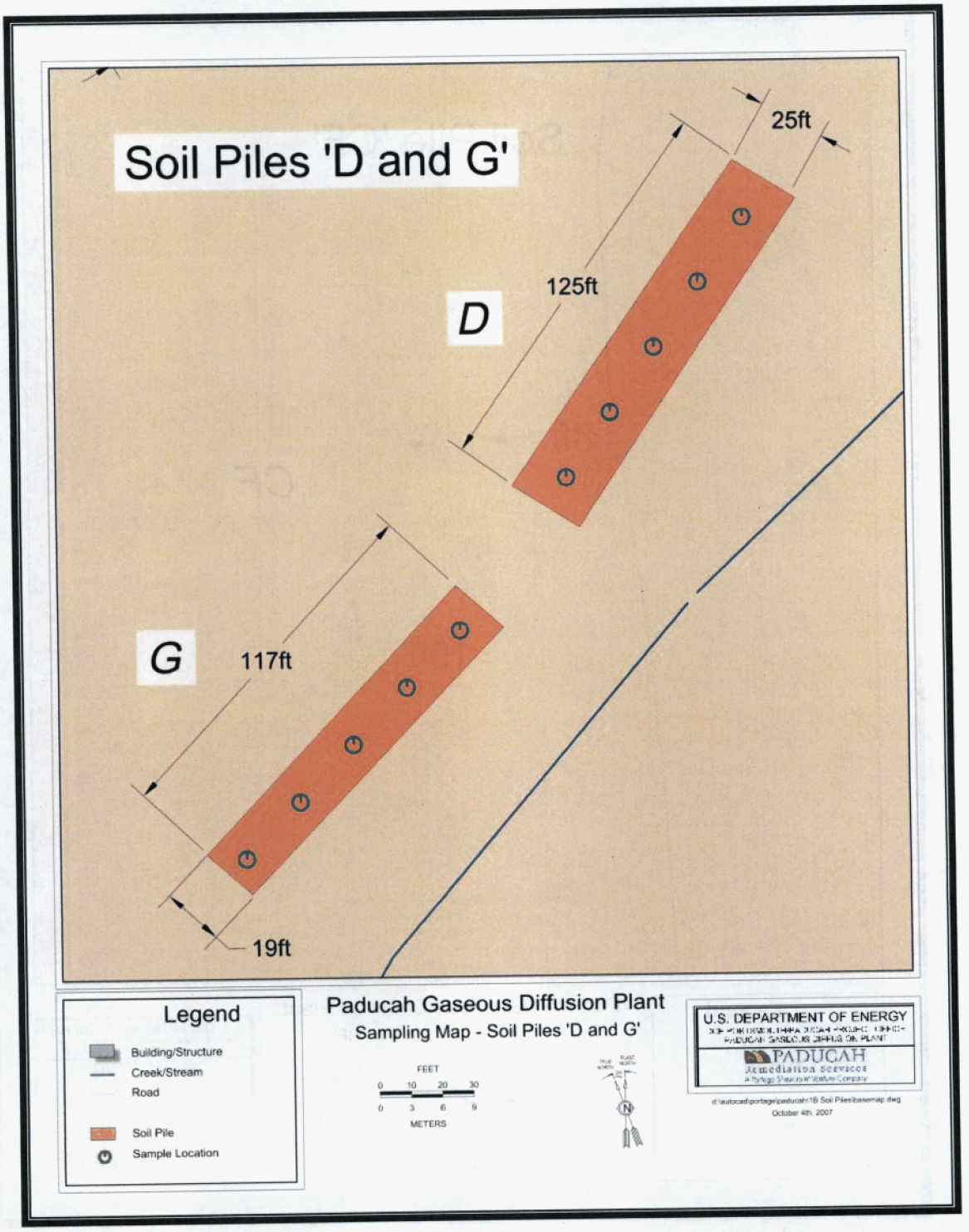

Soil Pile 'CB'
50FT
225ft
CB
BZ
50ft
20ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'CB'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007

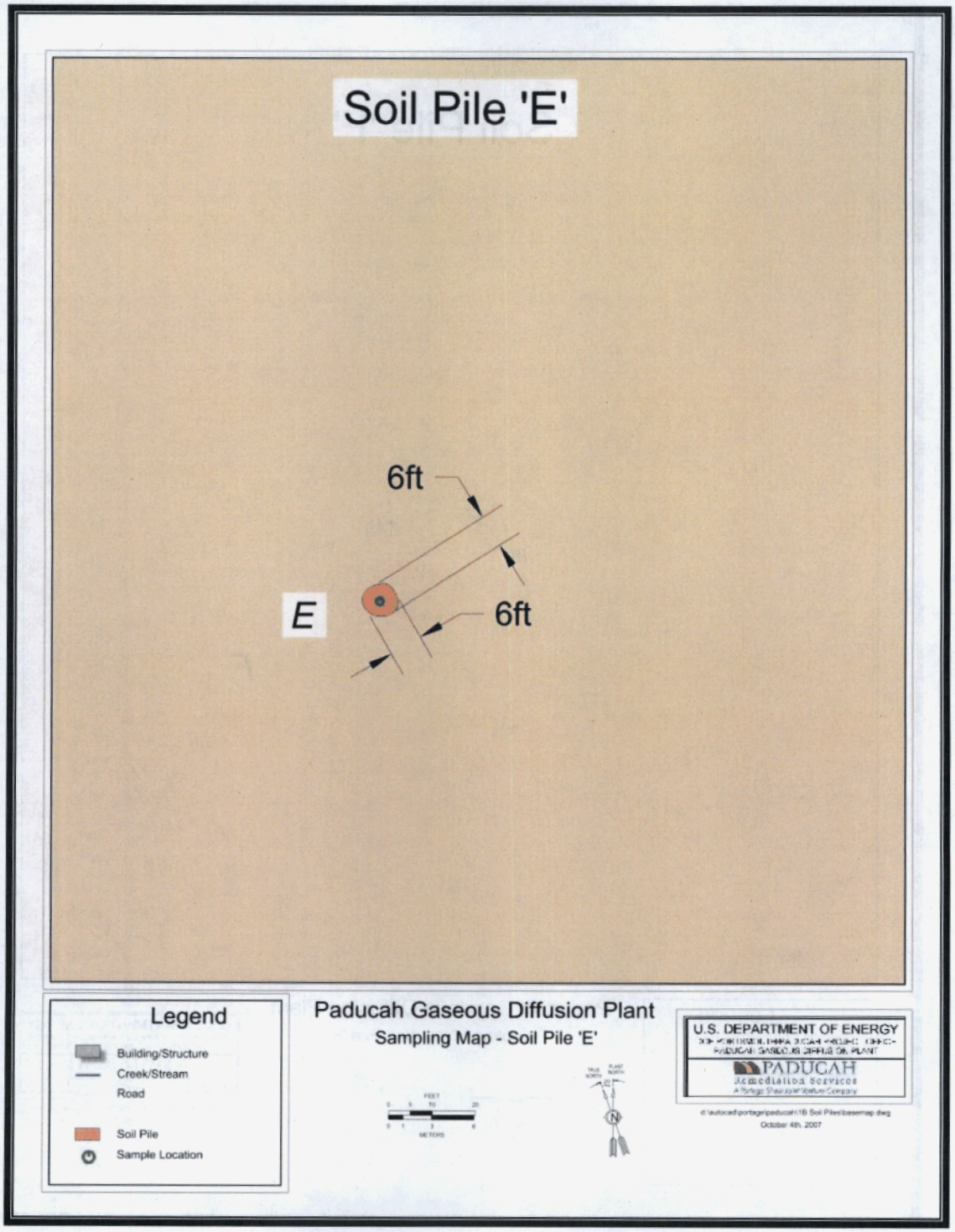

CC
Soil Pile 'CC'
75ft
25FT
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'CC'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

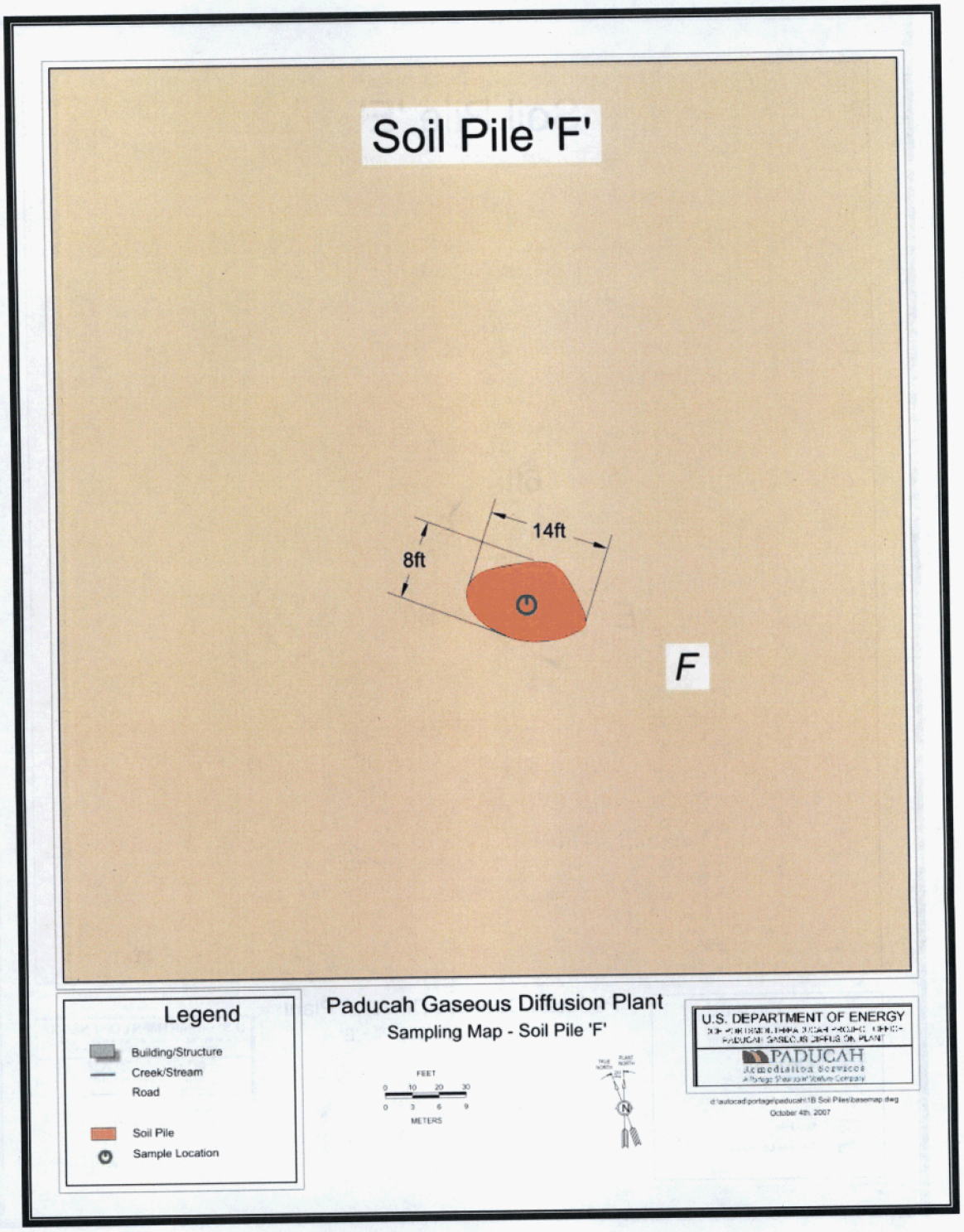

Soil Pile 'CD'
12ft
CD
10ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'CD'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

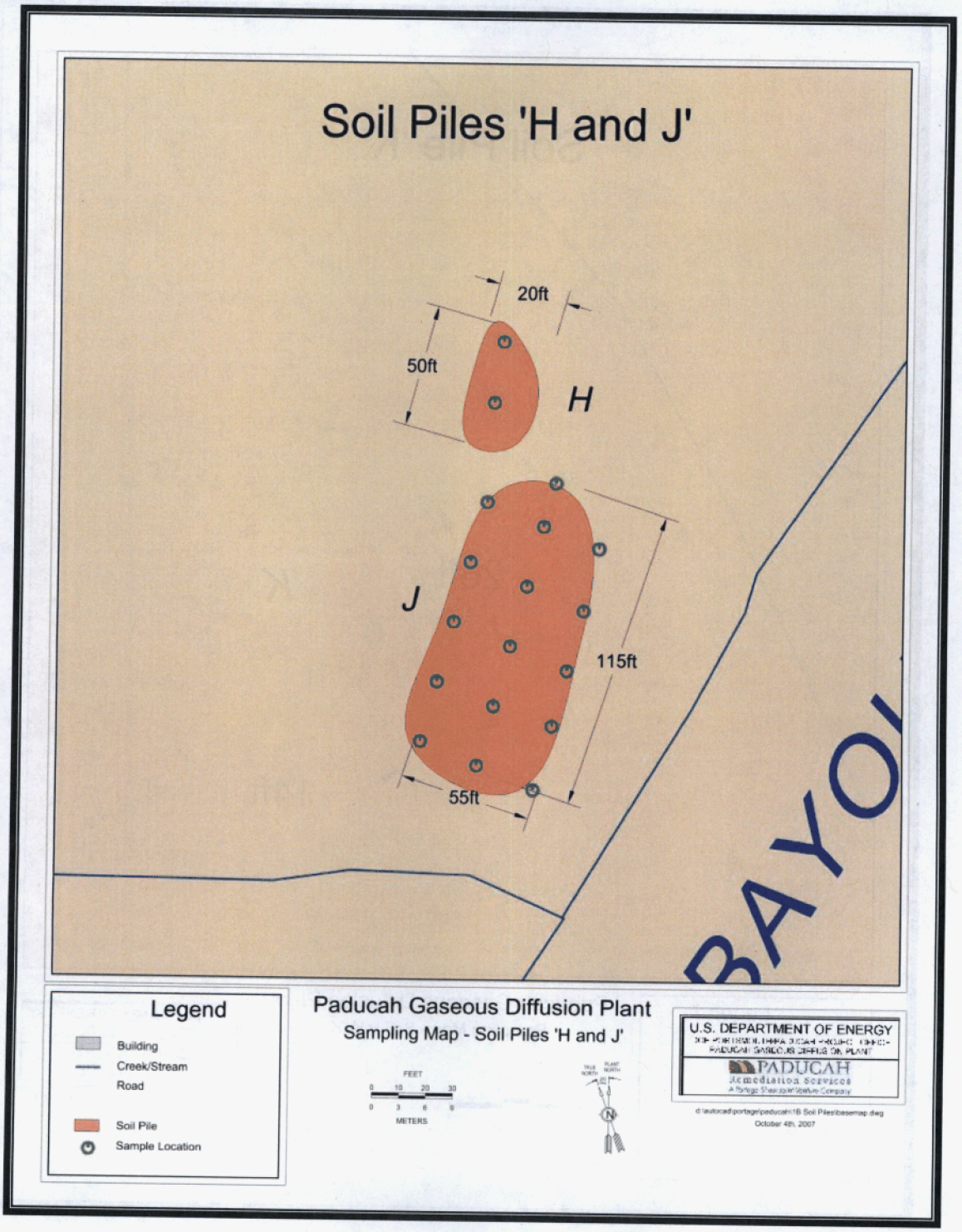

30ft
Soil Pile 'CE'
CE
42ft
42FT
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'CE'
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

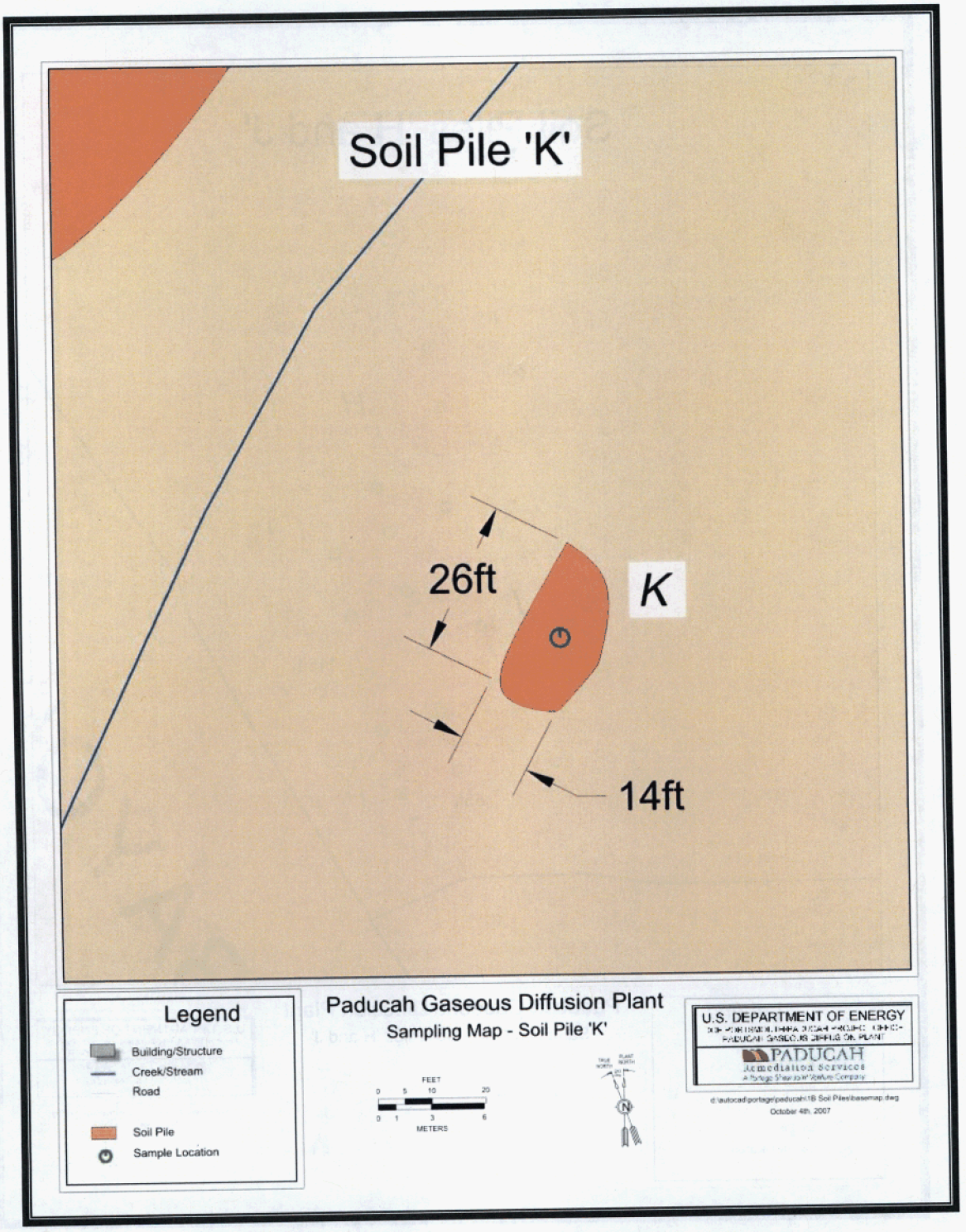

Soil Pile 'CF'
8ft
CF
15ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'CF'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

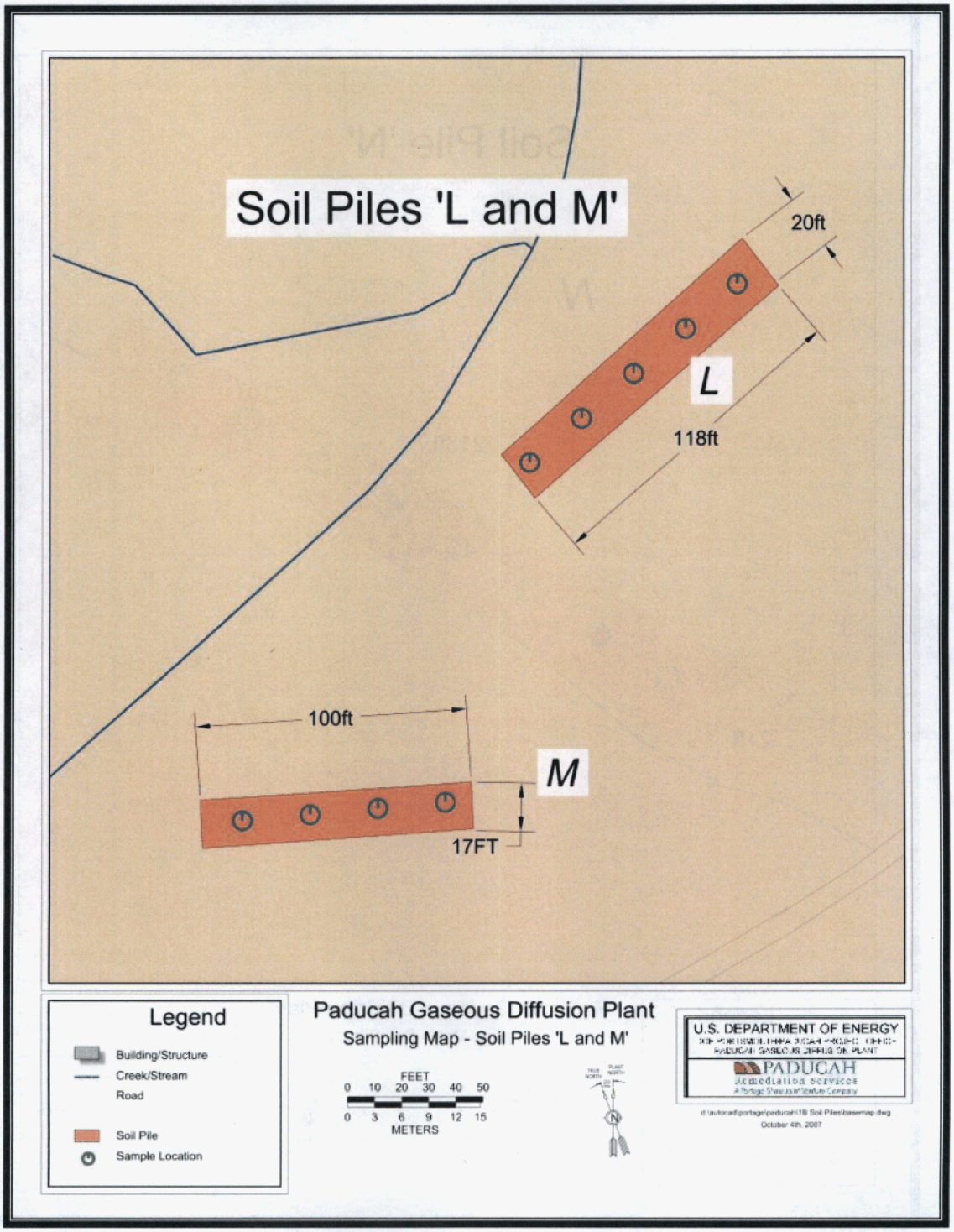

Soil Piles 'D and G'
25ft
125ft
D
G
117ft
19ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'D and G'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

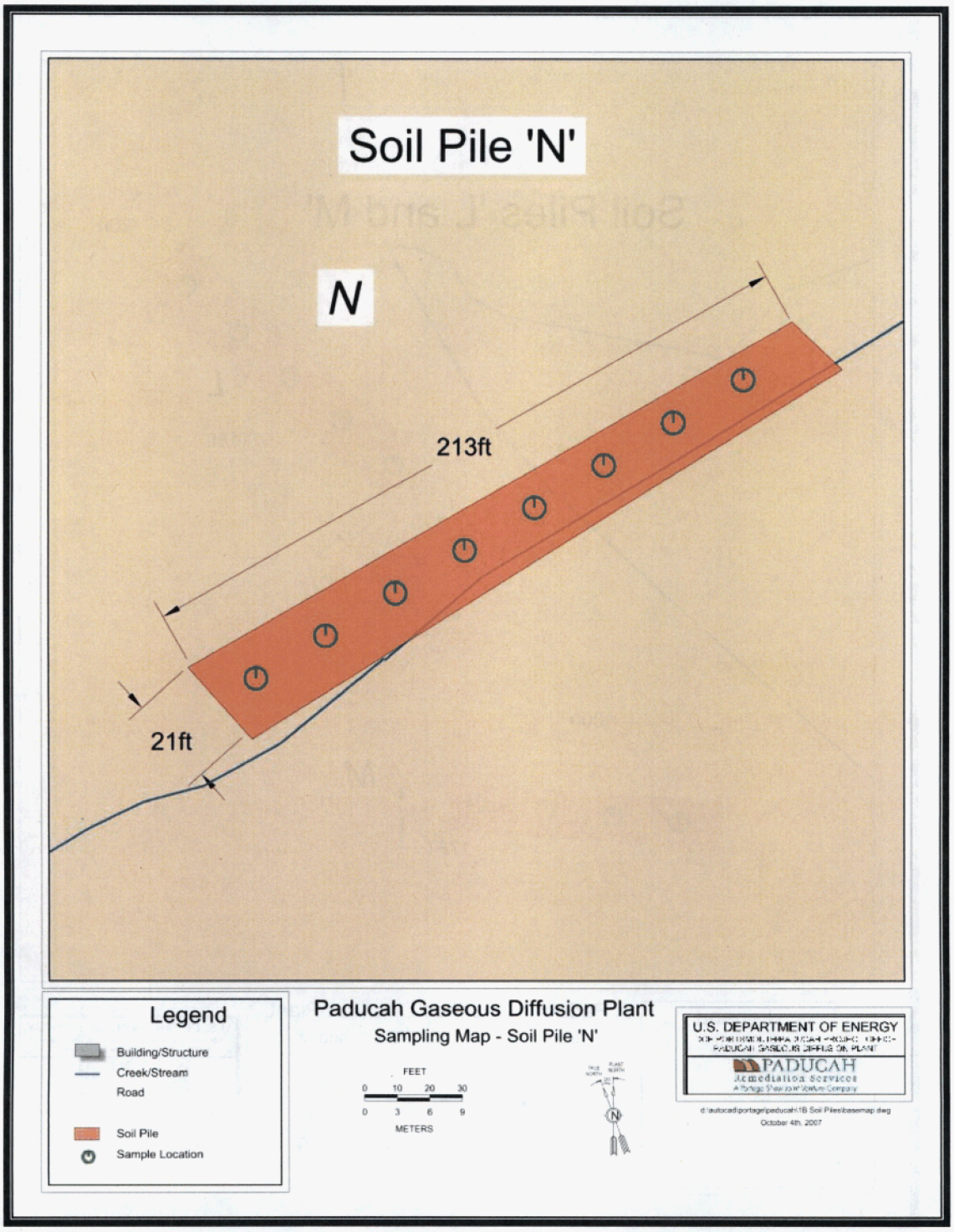

Soil Pile 'E'
6ft
E
6ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'E'
U.S. DEPARTMENT OF ENERGY
PADUCAH
October 4th, 2007

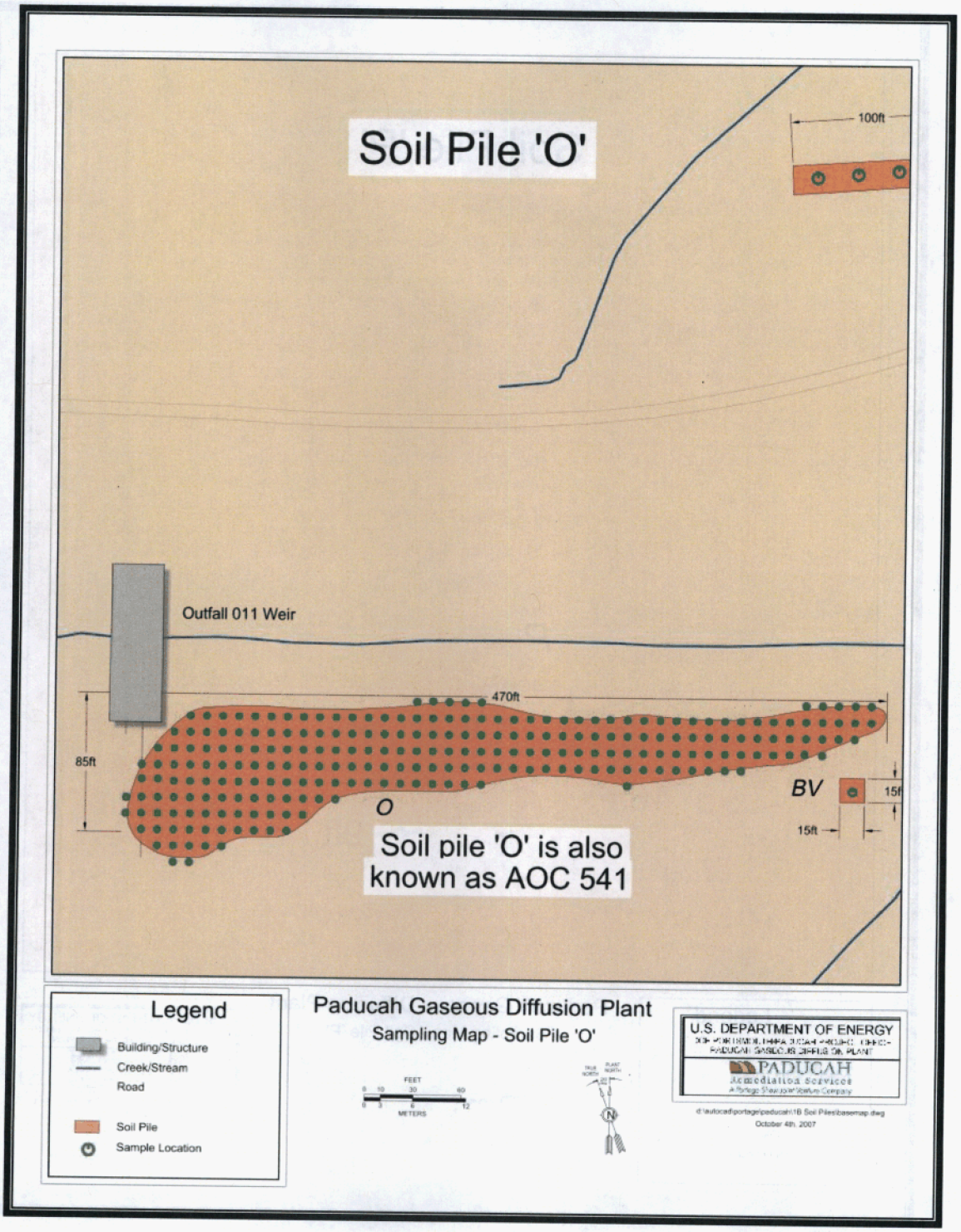

Soil Pile 'F'
14ft
8ft
F
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'F'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
d:\autocad\portage\paducah\1B Soil Piles\basemap.dwg
October 4th, 2007

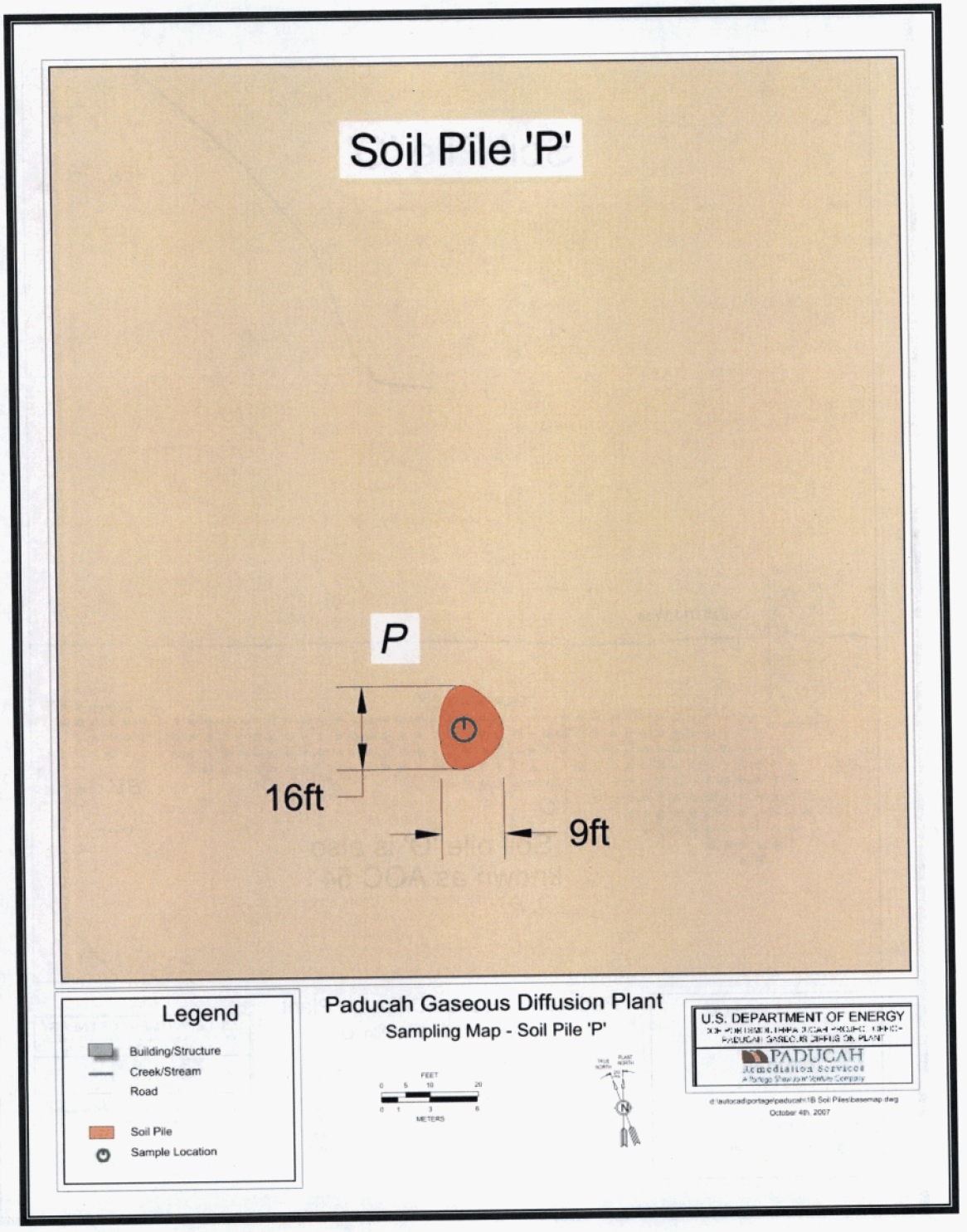

Soil Piles 'H and J'
20ft
50ft
H
J
115ft
55ft
BAYOU
Legend
Building
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'H and J'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
A Portage Environmental/Ventura Company
October 4th, 2007

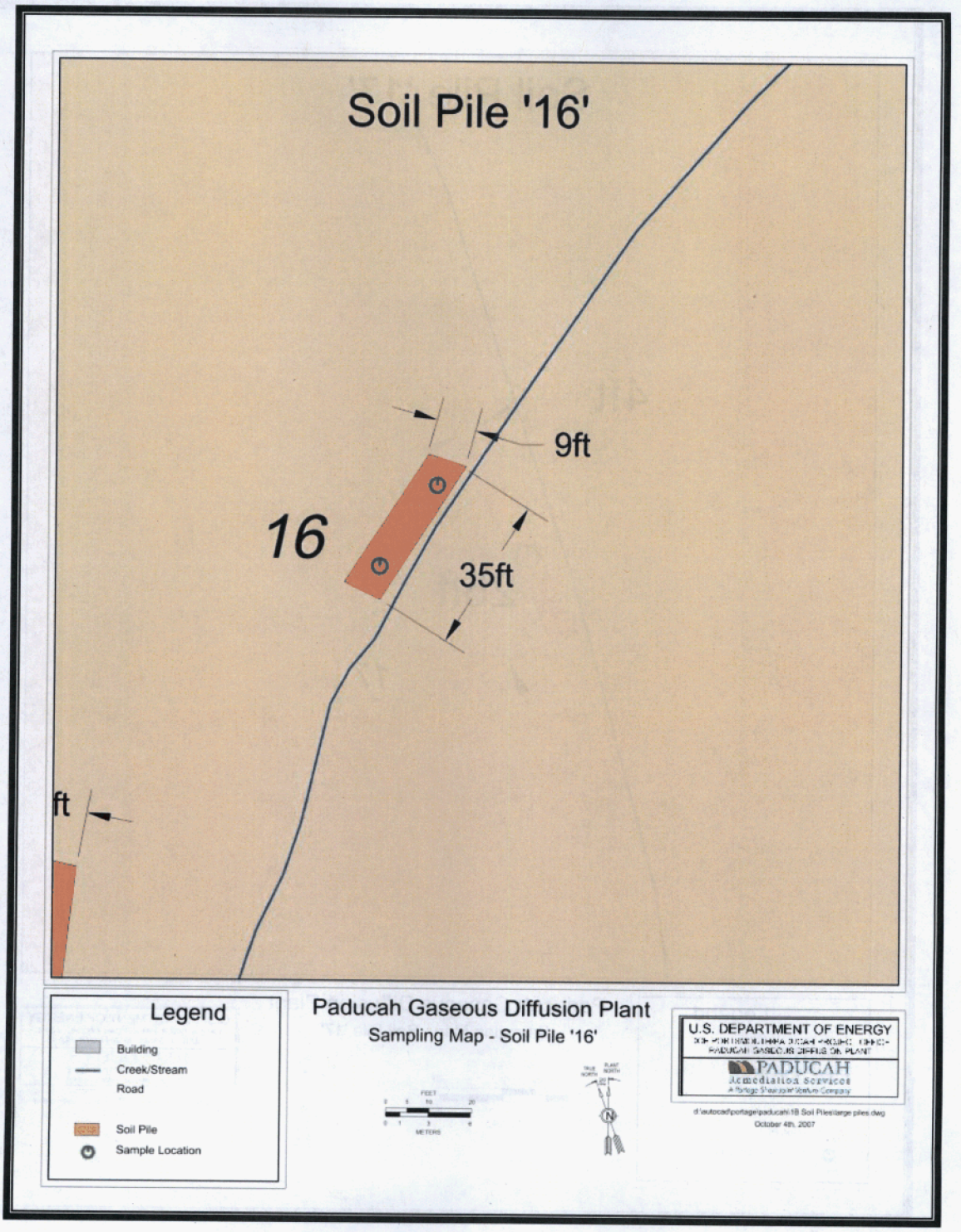

Soil Pile 'K'
26ft
K
14ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'K'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

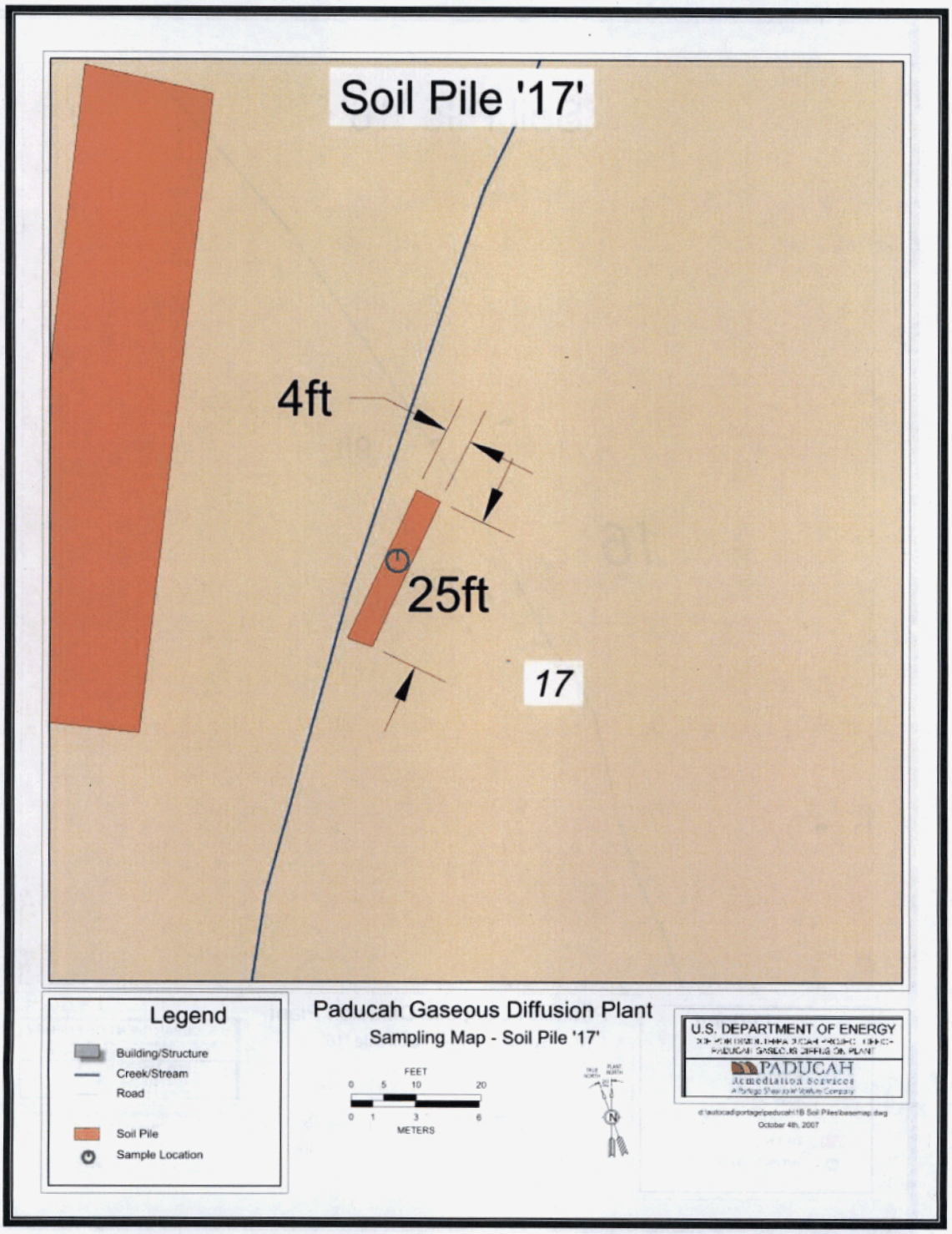

Soil Piles 'L and M'
20ft
L
118ft
100ft
M
17FT
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles 'L and M'
FEET
0 10 20 30 40 50
0 3 6 9 12 15
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007

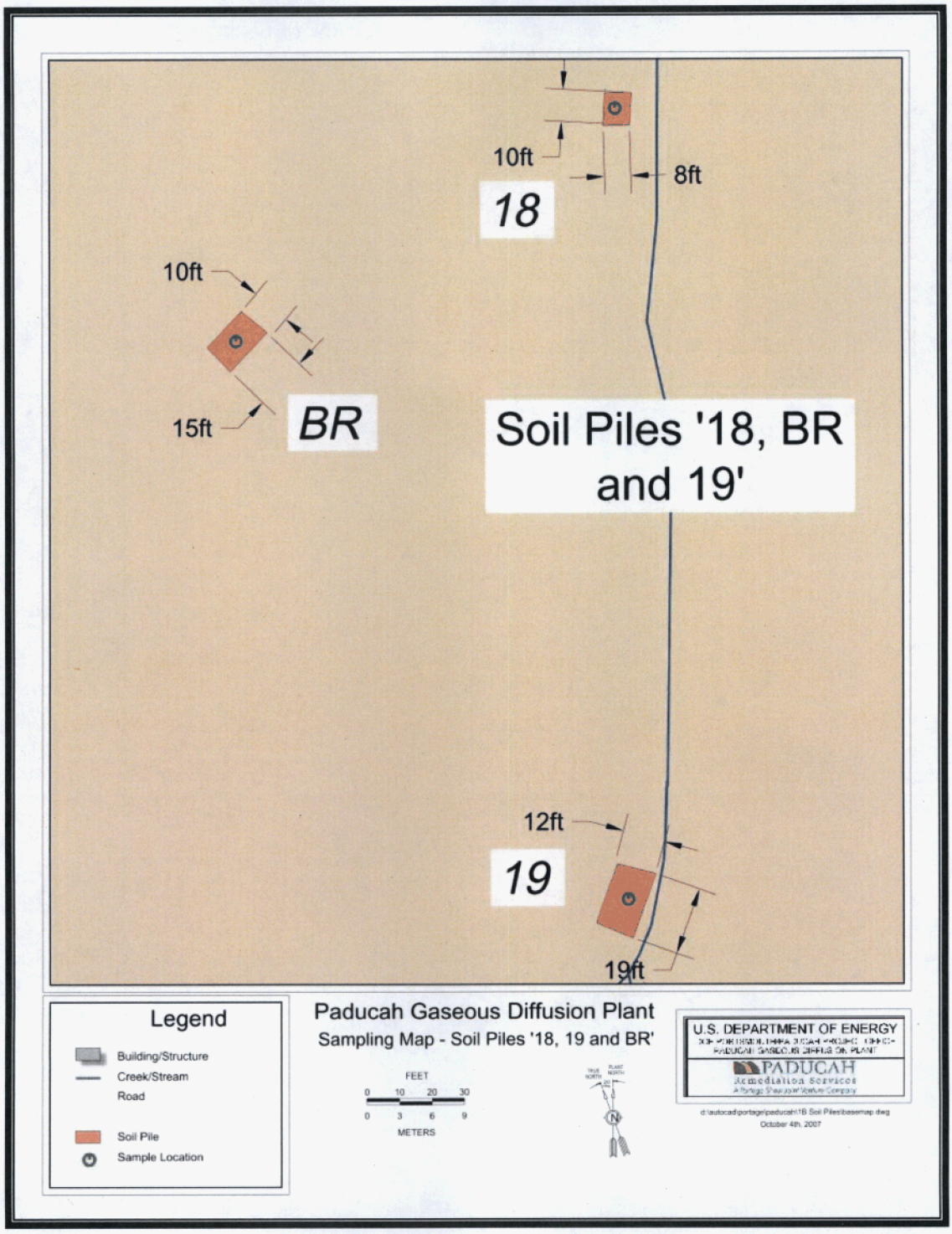

Soil Pile 'N'
N
213ft
21ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'N'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Acceleration Services
October 4th, 2007


Soil Pile 'O'
100ft
Outfall 011 Weir
470ft
85ft
O
BV
15ft
15ft
Soil pile 'O' is also known as AOC 541
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'O'
FEET
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


Soil Pile 'P'
P
16ft
9ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile 'P'
FEET
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


Soil Pile '16'
9ft
16
35ft
ft
Legend
Building
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile '16'
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


Soil Pile '17'
4ft
25ft
17
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Pile '17'
FEET
0 5 10 20
0 1 3 6
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007


10ft
8ft
18
10ft
15ft
BR
Soil Piles '18, BR and 19'
12ft
19
19ft
Legend
Building/Structure
Creek/Stream
Road
Soil Pile
Sample Location
Paducah Gaseous Diffusion Plant
Sampling Map - Soil Piles '18, 19 and BR'
FEET
0 10 20 30
0 3 6 9
METERS
U.S. DEPARTMENT OF ENERGY
PADUCAH
Remediation Services
October 4th, 2007